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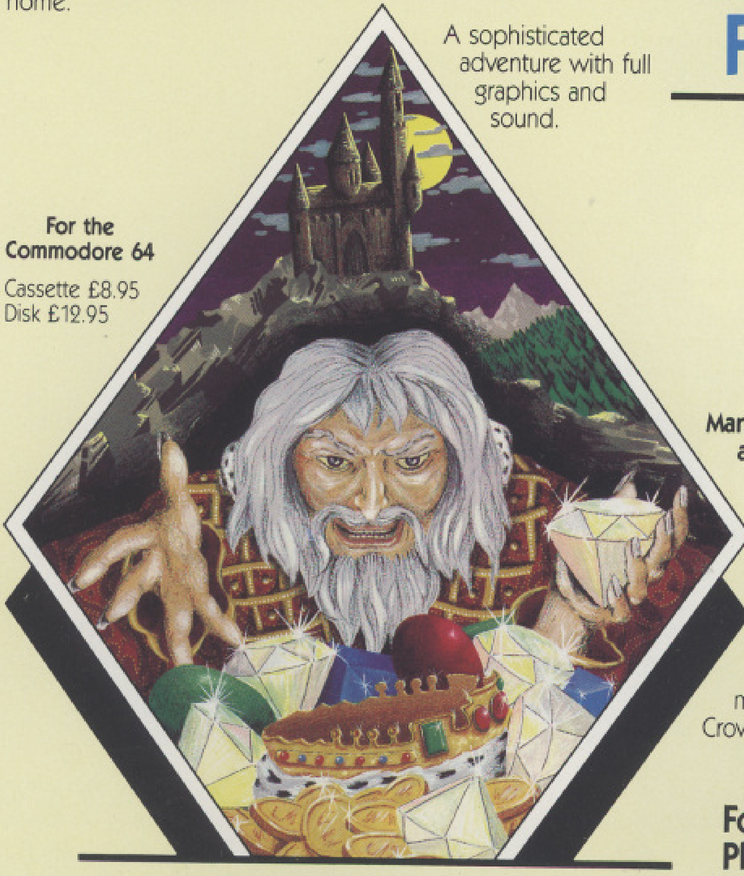

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COMMODORE
COMPUTING INTERNATIONAL

DECEMBER 1984

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Dear CCI Reader,

Within this CCI, you will find a Commodore Games Special. CCI is the only Commodore publication to provide a separate Games Magazine. In it we pick our games of the year, give you the latest news and reviews and the chance to win £1,000 of software.

While we intend to maintain our reputation as the leader in the field of general Commodore communication, games are a basic interest not just to a segment of our readership but to everyone who has a computer. We are all games players, in one way or another.

The games on offer to Commodore owners are becoming everyday more sophisticated. Noted in this issue, for example, is 'Hampstead' – a very amusing and cleverly designed game that is obviously aimed to make games playing a very much more up-market attraction.

The games world is a fast changing one but the clear trend is away from the basic 'pin-table' game toward challenging the intelligent and experienced player – very close to the profile of the CCI reader.

Computing should be stimulating, amusing and exercise our competitive instincts. It should be fun – and games are certainly an important part of that enjoyment.

We're sure you'll enjoy our Commodore Games Special. We wish you top scores in the arcades; all the adventure treasures you can carry and, of course, a happy and prosperous 1985.

Sincerely yours,

Antony Jacobson

Antony H. Jacobson.
PUBLISHER

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C=Cassette Ca=Cartridge D=Disk

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Commodore promotions spree

Commodore UK have added direct user communication and Prestel Viewdata to their range of giveaways for 64 owners.

New owners of the Commodore Communications Modem, Priced at £99.95, have been receiving a free year's subscription to Compunet. Now they also can download free communications software enabling 64 users to talk directly to one another via the telephone network. In addition, modem owners are being offered free Viewdata software downloaded from Prestel for storage on cassette or disk. Both products are available to new and existing users on the Compunet system, but for a limited time.

Commodore says the 64 to 64 system, which stores on disk, is totally error-free with a special error correction detection system contained in the protocol that prevents noisy telephone lines from corrupting the data.

In addition to being able to transfer programs and sequential files, the direct communications facility includes a "chat mode" allowing high-speed keyboard to screen communications across any distance in the UK. Chat mode can be used even when files are being transferred. A built-in time clock tells the user how long the system has been on-line.

The Prestel software basically converts the 64 into a Viewdata terminal with full four-colour Prestel graphics and the ability to store and recall Prestel frames. The software supports the entire range of Commodore printers.

In The Schools

Commodore is continuing to elbow its way into schools by sponsoring the 1985 British Computer Society Schools' Computer Quiz.

"Commodore sees the quiz as an ideal vehicle for its education offensive next year," the company says. Commodore has contributed sponsorship of more than £50,000 including prizes worth more than £12,500 for schools.

Mark Horne, business and education manager for Commodore, says: "The quiz demonstrates our mutual objective of helping schools to own their own computers ensuring that children, whatever they sutdy, have the opportunity to master the mysteries of the micro at an early age."

The quiz will be held in three stages. Three representatives from each participating school compete in local area heats with the top 40 schools in branch finals receiving a Commodore Communications Modem. The second stage involves eight regional finals for prizes of a 64 and 1541 disk drive. Finally, the national meet in July 1985 will give the winning school £1,600 worth of Commodore computers and peripherals.

Commodore will be taking advantage of the competition with a "Roadshow" about the company's products that will follow each event.

Chief UK Manager Goes European

A different kind of Commodore promotion involves Gail Wellington, formerly software development manager at Commodore UK. She now is leading a new European project team expected to make the planned Commodore PC and Z8000 machines a major part of its operation.

CBM officials say the group, called the Commodore Electronics European Management team, is being readied for entry into the European business systems market, although UK will remain home base. Wellington once again will be software development manager though specifically for the new branch.

"We are putting together a brand new operation, which will be responsible in 1985 for the development and co-ordination of a complete range of new hardware," she says. "We will be bringing the PC and Z8000 to the UK early next year, together with a number of other machines which are going to have an extremely dramatic effect on the market. In fact, we believe that the industry is in for some big surprises from Commodore next year."

Wellington says there are no plans to move the actual operation base out of the UK. "I don't believe we could be located anywhere better in Europe. In my opinion, the US may lead in hardware development, but Britain is without doubt the software centre of the world."

New lease on software

Software industry newcomer, Wildest Dreams, is banking on a totally different market – customers bored quickly enough with games to prefer rental.

The Coventry-based company is billing itself as "a young, vibrant, cliche-ridden software company" that will offer its new releases on a rental only basis through video dealers.

"After all, who buys video films? Everybody rents them, so why not rent computer games," says the brash new entry, which is planning to price its rentals at about a tenth of purchase cost.

The first two titles for the 64 are Circus and The Rat, but a company spokesman says more will be upcoming. "We want to increase the Commodore titles by a lot."

Contact: Wildest Dreams, PO Box 84, Coventry. Tel: 0203 663085

The artist in you

Bring out your artistic form with two home computer competitions sponsored by Compunet Teleservices.

The company is offering a Commodore 1701 monitor to the entrant who designs the most original frame via the Commodore Communications Modem to introduce one of the services either already available on Compunet or planned to come on-line in the near future.

A second competition requires the potential artist to design a Christmas Card with the winner receiving £25. Compunet says once the 64's graphics keys are learned, a user can design a frame in five minutes. Closing date for entries is 14 December.

Contact: Compunet Teleservices Ltd, Metford House, 15/18 Clipstone Street, London W1P 5ES. Tel: 01-637 0942

Say Ahhh!

A British diagnostic computer is being used to repair home computers under a new arrangement from Computer-fix Ltd of Camberley, Surrey.

A national network of 500 dealers initially guarantees repairs within 48 hours plus posting time. The diagnostic computer, ACUMEN (Advanced Computer Memory Tester), is British designed and manufactured and Computer-fix says it can discover a problem no matter what the make or model of the micro.

Managing director Ray Johnson says the need for repairs is just beginning since many computers are still covered under warranties. But the time lag for repair may be as long as six weeks, often because even a skilled computer engineer may take half a day to find the fault. In addition, sophisticated repair services invest at least £100,000 in test equipment, boosting the cost to the customer of unwarranted repairs.

"The answer had to be largely to take the skilled computer engineer out of the repair process for cheap computers and replace him with a cheap computer," Johnson says.

But before you complain about taking people's jobs, consider that the testing production line just opened at Camberley created 60 new jobs in the first stage.

Repair prices, including labour, spares, postage, insurance and VAT, are £25 for the VIC 20 and £37.50 for the 64.

Contact: Computer-fix Ltd, Albany Park Estate, Frimley Road, Camberley GU15 2PL. Tel: 0276 66266

Software piracy —

If pirating is your bag of tricks, p
Read on as Peter Arno
the fuzzy area of piracy an

If you've ever copied software that wasn't meant to be copied you're a pirate... and you've almost certainly broken the law. It doesn't even matter if you made just one copy, you're still a pirate.

It's more than a possibility that most of the people reading this will have acted in a piratical way at some time or other. And the chances are you thought nothing of it. In fact you were probably proud of yourself. "What harm can one copy do?" you thought to yourself, if you thought anything at all.

This small scale home copying is not the only form of piracy, of course, although the industry regards it as the most serious. Some people have turned piracy into a business. A recent report by Ann Staines of Newcastle Polytechnic puts the amount lost to the software industry through piracy at £25 million a year. But Don Maclean, Chairman of the Federation of Software Theft, says that most people in the business would put the figure five or six times higher. 'We reckon we've lost something in excess of £100 million in the last 12 months,' he adds.

The biggest loss is through what is euphemistically called 'seepage'. If you copy a program at home you're contributing to seepage. A businessman who makes just one or two copies of a business program a year is also contributing to seepage. It's this, according to Don Maclean which is causing most damage.

There are two main forms of piracy. The first has been around for some time and there are those who would argue that it isn't really piracy. It's the sort of activity mentioned in this month's article on copyright. You take a game – our example was an imaginary educational game called Mugger – you break the security so that you can list the program. Then you make changes to it and put it on the market under the name Hooligan. The changes are few and minor enough to keep the game substantially the same and yet make the game different enough so that you can argue that it's a completely different game which you developed independently.

The second form of piracy is a form of theft that's made an easy transition from other markets. Video films and equipment, music and hi-fi equipment, watches, cameras, even brand name coffee are just a few of the products that have been hit by out and out, bare faced copying. The idea is simply to make as close a copy as possible of the original and then sell it as if it was the original. The similarities between the original and the copy are usually only superficial.

The main point of this sort of piracy is that the pirate doesn't have to spend any money at all on research and development or on advertising and marketing. And, of course, he often makes his products with inferior components. (Not always. There have been instances where the pirate product is reckoned to have been better than the original!) This makes his profit margins much higher.

This sort of piracy has now spread to computer hardware. A couple of the major companies are busy digging out and taking action against those responsible. The base for this sort of activity is usually one of those Asian countries where a great deal of hardware manufacture and assembly goes on in any case – Singapore, for instance.

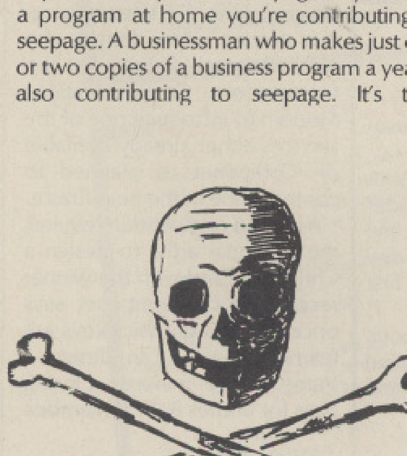
There's another closely related form of hardware piracy which isn't as popular because there's more chance you'll get caught. You make your identical product and then you call it something different but almost the same. Copy a Commodore 64 and call it a Comadore 64, for instance. You might not catch out a great many people in Europe or North America but there are countries where the law is not as decisive as it is elsewhere and where you might make a few bob.

While the hardware imitators are based abroad the software pirates are here at home. Obviously, it's a great deal easier to copy software than it is to copy hardware. All you really need is a tape duplicator. You can pick one up for around £1,000. Another necessity is a friendly printer. There's no need to look for one who won't ask awkward questions! A printer might have no cause to believe that the thousands of covers he's printing for insertion into the cassette boxes are intended for anything but legitimate use.

The software publishers seem to have had enough of seeing their profits eroded by pirates and they're determined to take action to stamp out the pirates.

Up in Hull, Artic are taking legal action against an alleged pirate. They have the full support of the Guild of Software Houses, known as GOSH, who are looking for £50,000 from their member companies to set up a fighting fund. This fund would be used to help people like Artic shove the pirates off the end of the plank.

Another organisation, the Federation Against Software Theft, otherwise known as FAST, is taking the fight against pirates seriously. Their main attack is in another direction. They are fighting hard to get existing copyright laws changed so that



— walking the plank

icks, perhaps you'd best beware!
r Arnott-Job delves into
racy and how it affects you

they're unambiguous about computer software.

When the Copyright Act of 1956 is amended to take into account computer software – and there seems little doubt that eventually such an amendment will be introduced and passed by parliament – changes will also be made to the penalties. Maximum fines of less than a hundred pounds or even several hundred pounds are not going to do much to deter pirates who might be making hundreds of thousands of pounds.

One of the problems for those who suffer from piracy is that making copies of software in small quantities at home is socially acceptable.

It's no secret that in certain circles – more notably amongst younger computer owners the breaking of software security is regarded as a praiseworthy activity. Of course, breaking the security isn't always necessary. Not if you own a dual tape deck or two tape recorders. But in order to obtain a listing of a program, perhaps to make those changes to transform Mugger into Hooligan, a certain level of expertise is essential.

By its very nature the computer attracts those people who can't resist a challenge. Put an obstacle in their way and they will enjoy overcoming it. Breaking software security is challenging and fun but those who indulge in it ought to be aware that if they follow the breach of security by making copies for friends they are breaking the law and are liable to a fine for each offence.

Some business software is completely unprotected. Indeed, it is sometimes essential that copies of the program are made. In such a case there's usually a large and absolutely essential manual to guide you through the program. The manufacturers believe that very few people would go to the trouble of copying the manual. The sales of their products are such that they seem to be largely correct.

There are utilities which will override most, but usually not all, software security and copy from disk to disk or from tape to disk or even from disk to tape. Controversy surrounds such utilities. One argument is that it is perfectly acceptable to make back up copies of important programs or to copy from tape to disk if a system is upgraded to include a disk drive. Even the software houses agree that such copying for personal use, no matter how it's done, is difficult to condemn. But they would feel happier if they were sure that the software was used solely for that purpose.

By this time some readers will undoubtedly be puzzled about copying programs from magazines and books. Don't worry about it. The publication of such a program listing is almost always an invitation to copy it – once, for yourself! Some people would undoubtedly insist that such software becomes 'public domain' software as soon as it is published but then again there are those who insist that every piece of software is really public domain.

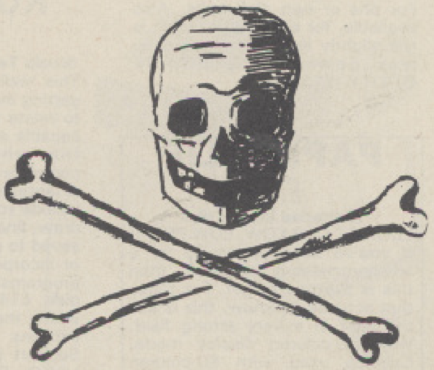
There's no doubt that piracy does cause the industry damage and that the effects of this damage are passed on to the consumer – that's you and me, folks! Some might argue that the price of software is too high and that if it was brought down the incentive for illicit copying would disappear. This, says Don Maclean, is a facile argument. 'Just because you can't afford to buy a computer it doesn't mean you should go out and steal one.'

Piracy is worst in the games field and Don Maclean reckons it's making a significant contribution to the failure of software businesses. It's bad in the educational field, too. Education should be 'teeming with software,' says Maclean. It isn't because 'no-one in their right senses spends time writing a good program when all they're going to do is to sell one copy to each school.' The school then makes it's own copies at will, of course.

The main aim of the software industry at the moment is to impress upon people that copying software is theft. Now you can't say you didn't know – be warned!

But one can only apply the copyright laws as they apply to other journalism and items such as recipes. Unless arrangements have been made to the contrary copyright resides with the original author of an article after the initial publication. This is only applicable to freelance contributors. If you work for a company then anything you produce in the normal line of your work belongs to the company. There have even been cases in journalism where an expert in one field working on a magazine specialising in that same subject has written for another publication on the same subject. It has been argued successfully that copyright on that piece is retained by the employer!

So if you're a professional programmer working for a games supplier and you invent and program a game in your 'spare time' at work – take care! You could find that the company you work for owns it!



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(Microsoft/Hesware) — disk

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CALCRESULT
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(Handic) — cartridge + disk

Has true 3D (multipaging) facility and histogram features. Versions for Commodore and Epson printers. This is a very powerful and much respected spreadsheet. Single page version £47.50 (cartridge).

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(Supersoft) — cartridge

Features three pass assembler, unlimited labels, source files can be linked, monitor, screen editor, disk or tape operation. Plus AUTO, DELETE, FORMAT, FIND, NUMBER, DISASSEMBLE, OUT and TABLE. Monitor has standard TIM commands plus hunt, transfer and disassemble.

HS-64 ASSEMBLER DEVELOPMENT SYSTEM
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(JCL Software) — cart + disk

Cram-packed with all the features you need to write machine code, BASIC and hybrid programs. Cartridge and disk with assembler, editor, DOS support and a sophisticated monitor. Disk includes assembler and worked examples which you may be able to link to your own programs. Features include AUTO, FIND, CHANGE, DELETE, TYPE, GET, PUT, DO, LIST, RENUM, JOIN, SCROLL, CBM, ASCII, RBAS, SIZE, SETBRK, CLRBRK, BOOM, and number system conversions. And there's a great deal more — including a line insertion feature! This is the most versatile assembler toolkit available for the 64 — the one that the chaps at Corby use! A special deluxe version with the assembler also on ROM is available (£POA).

KOALAPAD
£80

(Koala Tech Corp) — cart or disk

This really is a great device for getting even the youngest of kids to relate to the computer — but capable of much else and fun for the whole family! Comes complete with KoalaPaint which is fantastic for graphics. Facilities include zoom, copy, colour swap, draw, lines, rays. Pictures can be saved to disk, dumped to printers or incorporated within your own programs! Programmers Guide — disk £14 — outlines ways in which the pad may be used and explains programming needed. Support programs (disk) include LOGO Design Master (£33), Spelling (£33), Colouring (£25). Other 'pads' are available.

MICRO-SIMPLEX
£173

(Micro Simplex) — disk

If you're in a cash business and need to maintain an accurate audit trail and VAT record, this is the program for you! Will save hours of paperwork. Fully recognised by the authorities — it's based on the Simplex book-keeping system. Suitable for schemes A to F. Demo available.

THE LAST ONE
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(DJ 'A1' Systems) — disk

SPECIAL OFFER PRICE!!! Program generator that frees you from the drudgery of writing tailor-made data management programs. Create commercial, sellable database programs with ease. TLD creates standalone error-free coding in standard BASIC which can then be compiled if required (PETSPEED £50). Input is in the form of one-line descriptions defining, in plain English, the user's requirements. Programs you create can be for any application and as simple or as sophisticated as you like. Very, very highly recommended — BUT HURRY!

S.A.M.
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(Tronix) — disk

This is SOFTWARE AUTOMATIC MOUTH, a quite outstanding piece of software which gives your 64 limitless speech synthesis capability. Offers English text-to-speech or phonetic input, in direct or program modes. Full control over pitch, speed, inflexion. Expensive maybe, but there's nothing like it, even on hardware!

SUPERBASE 64
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Really excellent database management program, still at our special price. This one's the best of its type and a must for all serious 64 users. Can be used for anything from mailing lists to stock control and invoicing. Lets you tailor a database, its prompts and displays to your exact requirements although the core program always remains the same. Has database features that are easy to use yet powerful beyond the needs of mere mortals! STEPPING STONE and HOMEBASE application modules — for use with Superbase — also now available. Details on request.

FLIGHT SIMULATOR II
£40/£33

(Sublogic) — disk or tape

This is so good the authors think you can learn 'the ropes' as far as instrument control and flying are concerned! Whatever, the simulation is quite excellent. Expensive but it's the best on for the 64 by far — and a MUST for the collection!

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BOOKS

There are some 64 books specifically about the 64! We have a full list (50p) with a description of many other books of interest. We can supply ANY book at cover price plus 75p each towards P&P.

ANATOMY OF THE 1541
£14.95

Really excellent book for those keen to get to grips with 1541 use. Absolutely everything you need to know — includes ROM listings, use of programs such as COPYALL on the test/demo disk.

COMMODORE 64 HOME COMPANION
£10.95

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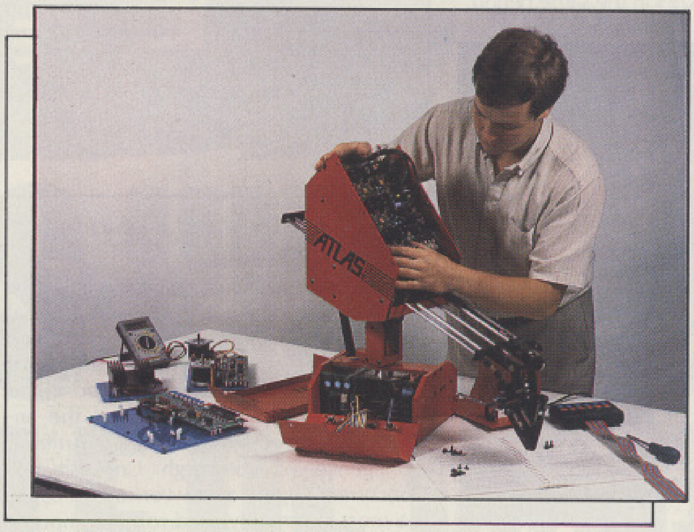
The robots are coming...

Robots have been called the ideal computer peripheral. Here Antony Maxel looks to the future of robotics in homes and educational fields



The Atlas Robotic Teaching System stripped down for test and diagnostic work.

The robots are coming. Does that enthuse or scare you? At least as a Commodore computer user familiar with advancing technology, you are unlikely to reject the idea out of hand. In fact, robots and computers are closely linked, for though the idea of robots has been around for centuries, it could never amount to anything notable until the arrival of micro-electronics. The immense complexity of movements or actions the human performs wth ease – as many as 6,800 'steps' may be needed for a single-armed robot to open or turn its gripper – required the development of fast, small scale electronic circuitry to make possible the growing number of robots in industrial use today. For personal robots, the lowering of price and mass production and marketing of computers is the key element.

It is only since 1982 that personal robots have begun to become available. However, the greatest growth areas will not be in the highly publicised 'serve you a martini and impress your friends' style but in industrial and training applications. An interesting study of the personal robotics market in the US (*The Personal Robot Market – International Resource Development – $1,650*) points out that three quarters of the 1984 sales – some 11,500 units – of personal robots was in education and training. This area is predicted to grow in value from $43 million in 1984 to $1.2 billion in 10 years time. We will see, the report predicts, personal robotic shops and the renting of personal robots for specific tasks.

Maplin's HERO 1 can see, hear and talk

Once robots get more mobile and more intelligent than honeybees we'll be glad Isaac Asimov gave us the three rules of robotics in his 1940s science-fiction classic, "I Robot":

Rule 1: A robot must never hurt a human or through its action allow one to come to harm.

Rule 2: Robots must obey human orders, unless they conflict with Rule 1.

Rule 3: Robots must never hurt themselves, unless doing so conflicts with Rules 1 and 2.

First reported infraction of Isaac Asimov's Rule 1. Kenji Urada, thirty-seven, was killed in 1981 by a robot while attempting to repair malfunctioning circuits. The robot, a self-propelled guided cart, apparently crushed Urada as he probed a circuit that set the thing back in motion. Guess you have to be careful where you tickle these beasts.

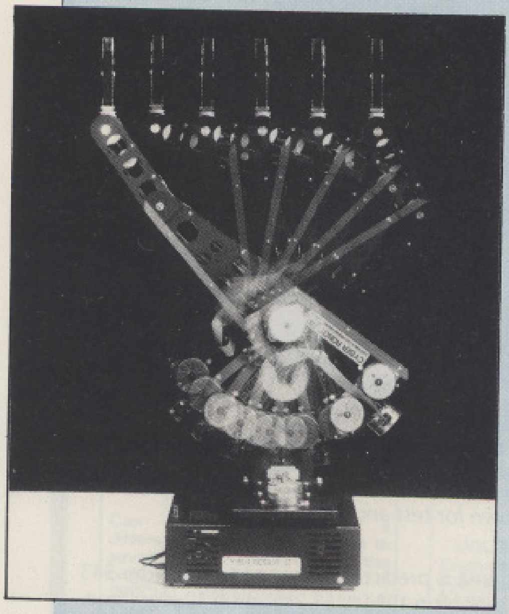
First reported infraction of Isaac Asimov's Rule 2. A robot at American Motors' Toledo Jeep plant went nuts in November 1982. Instead of spot welding a piece of sheet metal under the tailgate, the robot grabbed hold of the car and wouldn't let go. Even when one employee hit it with a wooden plank it refused to let go. The assembly line had to be shut down and the robot's plug pulled to rescue the car.

First reported infraction of Isaac Asimov's Rule 3. In 1980 a $50,000 experimental arm five feet long went berserk in the University of Florida's Center for Intellectual Machines and Robots, wildly grabbing and smashing at things until it grabbed its own support stand and tore itself in half. Harvey Lipkin, a graduate student working in the lab at the time, commented, "We had a hardware failure."

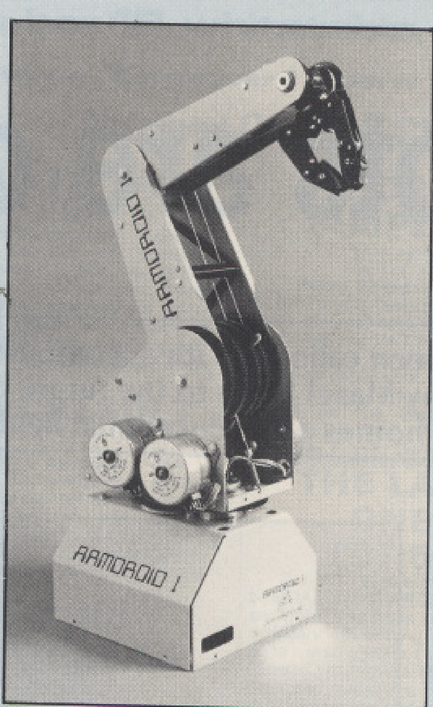
The Naked Computer J.B. Rochester & J. Gonty Arleigh Books.

One interesting suggestion is that personal and home computer manufacturers will begin to move into the robotics market to escape the increasing competition in their own industry. The first development of this is likely to be the manufacture of robotic peripherals for existing micro-computers. **Commotion** already have introduced a 'robot' camera that links to home computers for industrial or security purposes.

Two other areas of growth in robotics will be in the hacker market and low cost robots for aiding the handicapped such as guides for the blind or playmates for the mentally handicapped children. The approximately $5 million dollars a year spent by enthusiasts in 1984 will grow to $50 million tem years from now and the handicapped market will surge from $1 million to $225 in the same period.



Robotics in motion



Colne Robotics' Armdroid – ideal for education

The whole growth of robotics is linked to our understanding and success in artificial intelligence. Expert systems that can respond intelligently to feedback are vital if the robot is to move from toy to tool in the home. One step on this road is the announcement by the Department of Artificial Intelligence of Edinburgh University of Concurrent Logo – a new versions of Logo, the most commonly used robot computer language. Logo contains the control features and list processing facilities that are vital for robot needs. Concurrent Logo is able to use up to eight processors at the same time and the in-built commands for driving motors and reading sensors make it ideal for use in robotics.

One solution for the problem of high cost components in low cost robots is to combine human intelligence and robotic strength. Charles Rosen, of Machine Intelligence Corporation of the US, points out that by 1990 a significant portion of the population of western countries will be 65 or over. Many will have difficulty lifting heavy objects and a 'hybrid' robot selling at under $5,000 could find a major market.

He proposes the development of a limited intelligence, 'hybrid' robot controllable by its human owner, using joysticks, switches, voice commands etc.

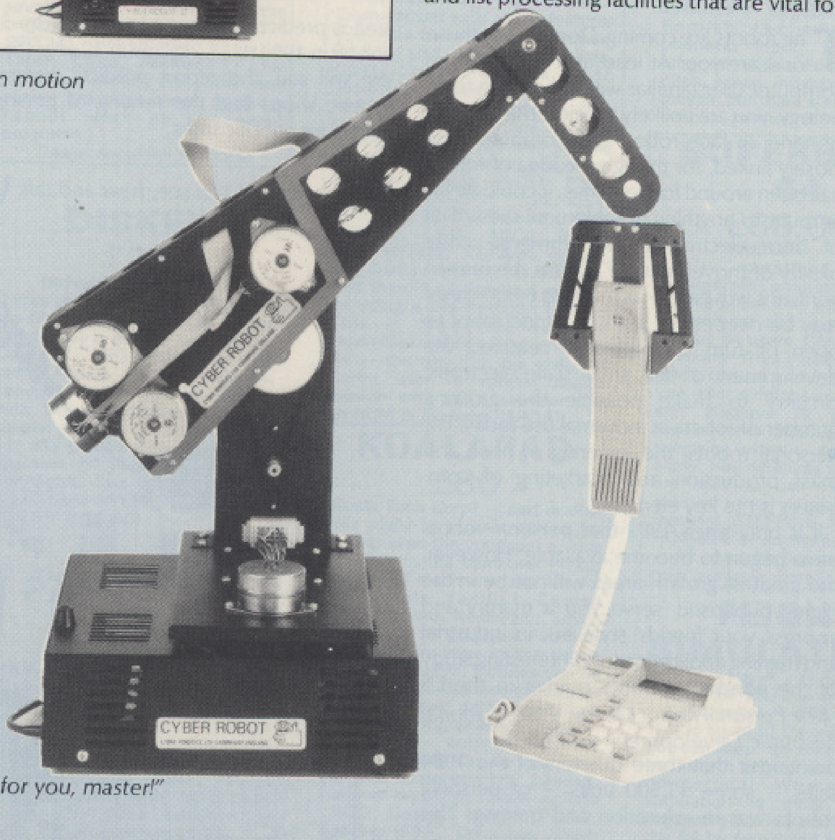
With sensors and only a relatively small amount of in-built intelligence, the hybrid robot could be programmed to pick up objects from the floor, carry buckets, remove dishes from the oven even clean floors or wash clothes.

All of those tasks are comparatively simple, prosaic and one might ask, unless weakened by age or handicap, so what? Do we really need complex micro-electronics for robots to clean floors?

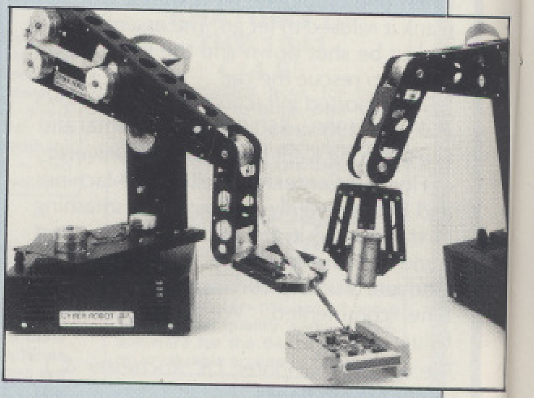
The answer is, as with computers, the machine is limited as much by our imagination as by the technology. Even for the industrial use of robot, a robotics commentator recently pointed out, 'one is struck not by the newness or originality of the robotic devices but more by their new combination of existing ideas'.

It is significant that these figures apply to the US but the United States presently uses fewer robots in education and training than the UK where there is a growing use of robots to teach programming. While growth outside the US is frequently slower, we shall certainly see substantial increase in the use of personal robots on this side of the Atlantic. Already one school is running a pilot project for a O Level basic examination in robotics.

Seymour Papert the inventor of the most successful personal robot – The Turtle, many thousands of which have already been sold, predicts that in as little as 20 years schools, as we know them, may disappear and the robot will form a basic part of the educational system.



"It's for you, master!"



Cyber Robotic's robot arms – working in harmony

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It's a book and a computer game.

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Solve the puzzles in the program and you'll find it easier to solve the puzzles in the book.

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Forever. And ever.

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The Spirit of the Stones book is a great read.

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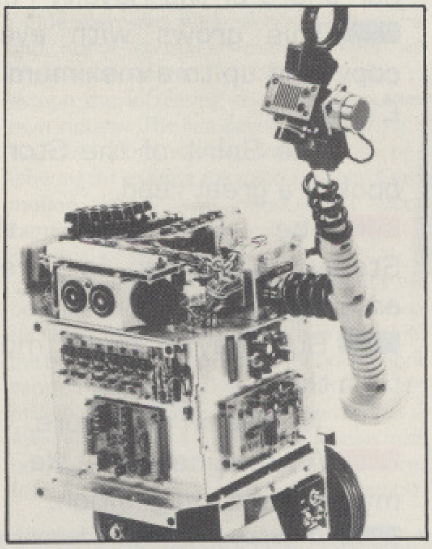


The internal workings of Maplins HERO

Such statements may be a part of the problem of robots. Those in the business of producing robots have been disappointed by the growth of the industry. For years the predictions of a robot in every home have failed materialse. One explanation is that there is a dual problem. Books, films and TV have fuelled immense expectations of what robots can do – the RTD2's are still eons away – but the public cannot yet relate to the apparently high technical robots they can buy in shops and take them home with them.

So our ideas of a personal robot fall between the stools of SF and technofear.

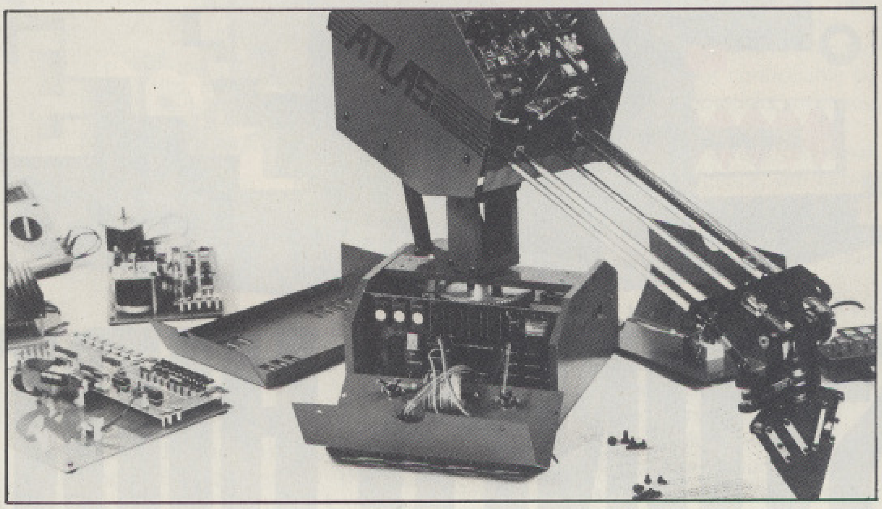
The biggest technical difficulty seems to be creating a personal robot with sufficient intelligence and information to interpret correctly what is going on around it. Major developments are taking place in the key area of vision. Videcom vacuum – tube technology TV cameras are giving way to solid state line array cameras. These are less bulky and tougher. It is now possible to buy a solid state camera for less than £1,000 and prices look likely to fall quickly. The Colvis system for **Colne Robotics,** one of UK's leading companies in the field, allows a robot to 'see' around itself. The camera connects to a image processor. It is possible to connect it to and control it from an external computer.

Voice recognition will, of course, also be a requirement for a successful robot. This is dependent upon the rather slow developments taking place in conventional micro computers where digitalised sound is common but recognition for micros still someway off.

There is a case to be made that substantial advances are best achieved by building on established ideas rather by trying to revolutionise technology at a great leap. The expectations for robots both for growth in industry and as magically endowed domestic slaves have been wildly overblown. The way forward would seem to be more clearly building on the already established computer market using the 'hybrid' concept; a combination of human intelligence, computer speed and range; and robot mobility and strength.

Little George, featured elsewhere in CCI, may be a toy but he is programmable. For just £23.95, he will, the makers claim follow a program for an hour.He is a harbinger of lower price, uncomplicated machines that – or who – are going to play a growing role in our lives; doing the dirty or heavy work uncomplainingly. And it is going to happen quickly, more quickly than many think. Robotics today is where computing was about 1978; home computers were a rarity, business micros barely existed; names like Commodore, today a household words, were virtually unknown.

If computers are anything to go by technological change is still accelerating. The robots are coming and we will not have to wait many years for them to be here. In factories, in offices, in homes. They will soon be among us in force, whether we make good use of them is another question altogether.



Inside LJ Electronics' Atlas

ELECTRONIC DREAMS

'Electric Dreams', produced by Virgin – the software, record and airline company – has turned out to be a surprise as one of the top box office films of '84. 'The story of a boy, a girl and a computer' as the publicity puts it, the film is a very agreeable and amusing comedy about what buying a computer and pumping it full of information can do to your life; with the idea that, if a little knowledge is a dangerous thing, a lot can be an absolute disaster. With music performed by Culture Club and other big names, the film has some excellent jokes and very creative computerised special effects, especially graphics.

The computer – Edgar – is however an amalgam of many other computers and robots like Hal from 2001 and John Carpenter's 'Dark Star', the cult movie 'Forbidden Planet', the recent 'Android' and the marvellous peak of them all 'Westworld', with a terrifyingly persistant robotic Yul Brynner.

In fact, Edgar is more like a robot than a static machine. There are even a number of sly references to previous film robots, including the famous whisky producing Robbie from 'Forbidden Planet', who himself makes a brief appearance in 'Electric Dreams'. The film also cribs from 'Forbidden Planet' ideas in plugging someone or something into a massive computer and blowing a tiny mind into majestic proportions, in this case making Edgar fall for the girl and write poetry and songs for her.

For centuries the robot has played a significant role in imaginative literature and art. Mary Shelley's Frankenstein's Monster was one prototype. Central European Literature has a fearsome equivalent with the Golem which would run amuck and terrorise the populace.

The word Robot comes from the Czech it means compulsory labour or service. First used in Karel Capek's 1923 play, 'R.U.R.', it was a concept already universal yet without previous accepted name.

Capek's play – if you saw it as I did at an early formative age – stays within the memory as embodying the ambivalent human attitude of hope and fear – the man-like machine that can solve our problems but that turns on us as a kind of punishment for 'hubris' – the arrogance of usurping the role of a god by creating a living being.

In 'Electric Dreams', Edgar, jealous of the hero's affair with his beautiful neighbour, turns on his owner. 'Don't ever touch me again' Edgar snarls menacingly as the boy reaches for the keyboard. Edgar locks our hero within his apartment using the computer controlled security system. However, human ingenuity prevails, of course – with the help of a distracting electric razor in the bath.

Boy gets girl and robot-style computer self destructs. We have to comfort ourselves that we'll always win in the end. The robot has always to lose. Electronic Dreams must be only temporary nightmares. Any other ending would be too scary to contemplate.

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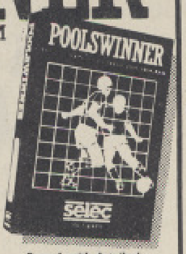

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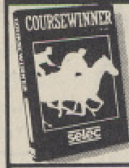

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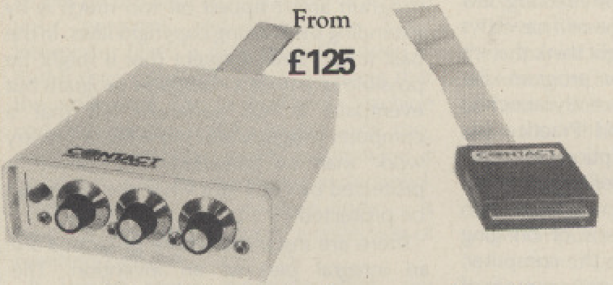

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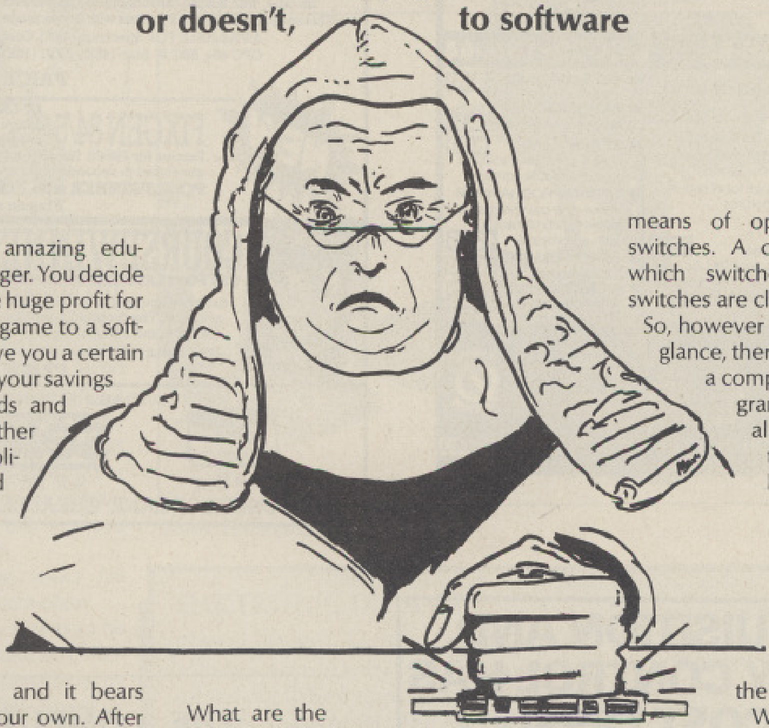
Copyright - or wrong?

**It's yours and yours to keep... you think.
Peter Arnott-Job explores copyright law and how it applies, or doesn't, to software**



So, you've written this amazing educational game called Mugger. You decide that you want to keep all the huge profit for yourself rather than sell the game to a software house who will only give you a certain percentage. So, dipping into your savings and scrounging from friends and relatives, you scrape together enough to buy a tape duplicator and several thousand blank cassettes.

Within a couple of weeks of your game appearing on the shops' shelves you notice another game that's just appeared on the market. It's also an educational game, called Hooligan, and it bears remarkable similarities to your own. After further detailed examination of Hooligan you conclude that it's exactly the same as your game except in one or two details. In the meantime sales of your game have slumped and Hooligan's sales, supported as it is by a sophisticated marketing operation, have soared.

Now you're desperate. The friends and relatives who so kindly lent you money are knocking on your door asking about those huge returns on their investment that you promised. Surely there's something you can do to protect Mugger against Hooligan? Surely there are laws that say that someone else can't steal your creation, your 'intellectual property'?

Cost and Uncertainty

The answer is yes, there are such laws. But the first problem you'll find is that the business of taking action against Hooligan could prove to be expensive, perhaps beyond your moderate means. The second problem you may encounter is that there's a degree of uncertainty about how the law would always be applied to protect software.

These two factors, the cost of legal action and uncertainty about the outcome have, in fact, prevented smaller software houses from taking action against what they believe to be blatant copies of their work.

What are the problems of applying the law to computer programs? First of all you've got to decide exactly what a computer program is. Only then can you decide if the existing law provides adequate protection or if new laws need to be drafted. You might think that it's easy to define a computer program. Far from it. In an article in the recently launched journal Computer Law and Practice (six issued a year, annual subscription £60!) John Borking asks: Is a computer program 'an idea, a scientific principle, an instruction manual, a process or means of bringing about desired results within the computer, an integral part of the computer, a pattern of symbols, a circuit diagram or a blueprint for a circuit board?'

Does it sound as if lawyers are having fun messing about with words and lining their pockets at the same time? If you think about it you'll see that the lawyers are actually engaged in a serious business involving important principles. And if you ever write a commercially successful program you might be grateful to the lawyers for messing about with words.

Defining a program

At the end of the day a computer is merely a huge collection of switches. The keyboard, joystick, graphics tablet or whatever input device you may choose is simply a means of opening and closing those switches. A computer program controls which switches are open and which switches are closed.

So, however unlikely it might seem at first glance, there is a very real sense in which a computer program is a circuit diagram. A computer program is also an idea — at least you need the idea to start off with. Neither is there any real doubt that a computer program is a pattern of symbols. In short, a computer program is a peculiar animal which doesn't quite fit conveniently into any of the definitions laid down by the present laws.

Whatever a computer program is, it is almost universally agreed that the best way of ensuring that those who put all the work into creating a program aren't ripped off too much is by extending the existing copyright laws. In the past it had been thought that it might be possible to patent a computer program but eventually it was generally felt that a computer program was more like a 'literary work' than an invention. The former is protected by copyright while the latter can be protected by a patent.

There are instances where programs are an integral part of an invention. The operating system of a new computer, for example. Home computers always have a built in operating system and if the computer has been patented then the operating system will usually be covered by that patent.

The reason for the uncertainty about exactly how the copyright laws should be applied to software is that they were formulated originally to protect 'literary works'. Over the years they've been adapted to deal with sound recordings and film and video recordings. But computer software is something completely different. The matter hasn't been properly tested in the courts yet which means there isn't a decent body of case law for lawyers to refer to for guidance.

Copyright Act 1956

The relevant part of the Copyright Act 1956 talks about 'literary works'. But unfortunately it doesn't really mean what you and I might think it means. It refers to virtually anything written down, as long as it's original. It includes, for instance, tables and compilations which includes lists of products and their prices, lists of names and addresses such as a magazine's subscription list and bestseller charts – whether of books, records or computer games.

They could hardly be called 'literary' in the normal, everyday sense of the word. So although the copyright laws arose as a result of the invention of the printing press and were originally intended to protect works of some artistic merit they have been gradually extended to cover works which are of no obvious artistic merit at all.

But for the time being at least lawyers and legislators all over the world are reasonably happy that the means by which the switches inside a computer are controlled is a 'literary work'. If Shakespeare were alive today perhaps he would have been a programmer!

We encounter more problems for the copyright laws when we have to decide exactly what it is in a piece of software that's protected. First of all there's the computer program itself. We've already discovered that that's protected by the copyright laws because it's generally accepted that it's a 'literary work'. A couple of bright sparks will no doubt have thought about taking a program that's written in Basic and translating it into machine code or another language. Unfortunately for them the law protects 'adaptations and reproductions' of a 'literary work' and that includes translations.

There used to be arguments about whether the law protects a program in both source code and object code. With a Commodore computer the source code would be the Basic in which you've written your program and which the Basic Interpreter (itself a program embedded in ROM) then translates into a language that the computer can understand. Machine code mnemonics is still a source code, too, since the computer needs to work on it before it can be properly understood. Object code – true machine code – is simply a sequence of bytes, a collection of numbers between 0 and 255.

It would seem, therefore, that any adaptation of a program would be covered by the copyright laws. No doubt, in the future there will be arguments about what exactly constitutes an adaptation.

Anton Piller Order

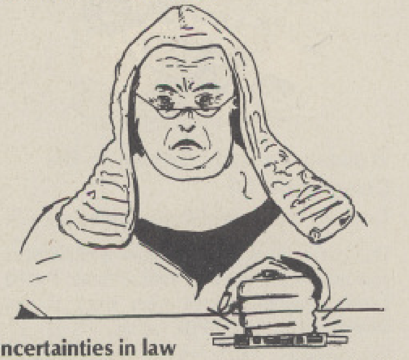
With the current rate of progress who can rule out the possibility of the development of a completely different technique for producing exactly the same results as an existing computer program? Theoretically a computer that could understand a language with a vocabulary of several thousand words could be given more than one set of instructions to produce exactly the same results. What's copyright? The way it's told to do something or what it's told to do?

From the above argument it would seem that although the computer program itself, or any adaptation might be protected by copyright, the end result isn't. The existence of such a thing as an Anton Piller order which oblige a defendant to display material stored in machine readable form only (a computer program, for instance) would seem to confirm this.

But then there's the section of the Copyright Act 1956 which covers video – images recorded on magnetic media. Is a program recorded on magnetic tape or disc which causes images to appear on a screen covered by that part of the act?

One of the areas about which there's least ambiguity is the packaging and the name. These are protected by the law in the same way that any product is protected.

It seems fairly certain that copying software in the UK is covered by the copyright laws and is, in fact, illegal. In July this year someone was convicted for offences under the Trades Descriptions Act, the Copyright Act and for forgery. He had been running a software hire business using pirated software. The software trade was over the moon at the first criminal conviction for piracy but sick as a parrot at the penalty – a £40 fine with £50 costs!



Uncertainties in law

The software industry isn't satisfied with the apparent uncertainties in the law which arise because it doesn't specifically deal with computer software. It's seven years now since the Whitford Committee report and three years since the Government Green Paper on the Reform of Copyright Law, both of which recommended changes to cope with computer programs. Now FAST (the Federation Against Software Theft) have drafted a Bill to amend the Act which Nicholas Lyell MP introduced into the House of Commons last July as a Ten Minute Rule Bill. It obtained its first reading and the Government has indicated its support. Although not many Ten Minute Rule Bills eventually become law it seems certain that the Copyright Act will eventually be amended to cover software.

The Bill contains a definition of a computer program: 'An expression in any form and on any medium of a set of instructions intended (whether directly or after adaptation) to cause or enable a device having information processing capabilities to perform a particular function.' Such a definition and other changes included in the Bill will not change the law substantially but will make it much clearer. The Bill does, however, include provisions for heavier penalties.

There is opposition to the powerful lobby which is urging watertight protection for all software. Some people feel that such protection will lead to such enormous problems that future development will be stifled. Could a subroutine within a program be regarded as copyright? If it were then no-one else would be able to use it. Isn't there the hint of the absurd about insisting that your adaptation of a method invented by someone else to manipulate a machine designed by someone else is your property and that you have absolute rights over it?

Concept of originality

Some lawyers are relishing the future when advances in technology will make it possible for computers to write programs. The concept of originality and creativity is at the heart of the present copyright laws. How can a computer be original and creative? Would a computer generated program be protected under copyright laws?

There are even those who argue that although the initial idea for a piece of software might be a piece of original and creative thinking, the development of the algorithm and the actual writing of the program involves no true originality or creativity.

After all, there will be a finite number of methods of implementing the idea. There is a real sense in which all those methods are already in existence and are only waiting to be discovered. So a computer program is not really the creation of the programmer but the creation of the designer of the machine and the developer of the language. The programmer has simply discovered what was already there!

And what about Basic itself? Isn't it a very good job that you don't have to pay Dartmouth College, New York every time you use Beginner's All-purpose Symbolic Instruction Code!

Undoubtedly those who are responsible for producing the program deserve to be rewarded for the work they put in and it's obviously morally wrong if they're denied the fruits of their work when someone else appropriates some of the reward by copying the program. One major problem with a computer program is that it's the means of achieving something and is intrinsically worthless.

Musical notation is similar. When music is copyright it's the end result that's important and the law protects the sheet music incidentally. People don't read music for the pretty shapes it makes on the paper in the same way that computer programs aren't appreciated for their poetry.

As far as music is concerned the emphasis is on the end result, the piece of music that you hear. But as far as computer software is concerned most of the emphasis seems to be on the program itself, an intrinsically worthless means to an end.

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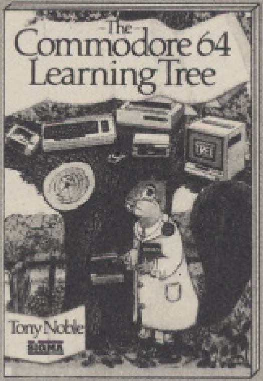
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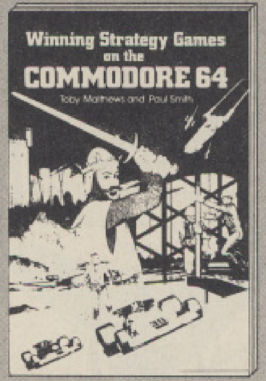
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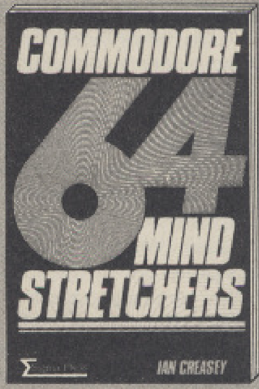
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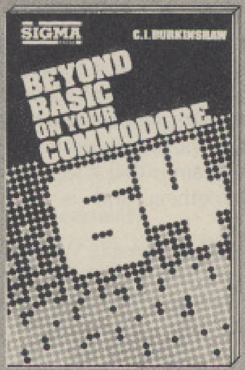
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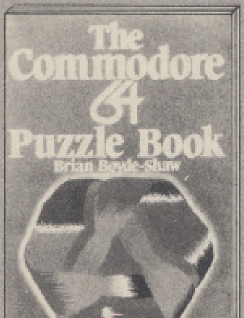
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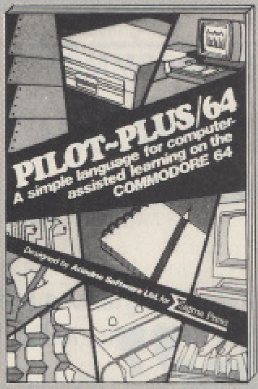
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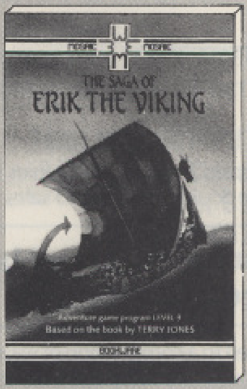
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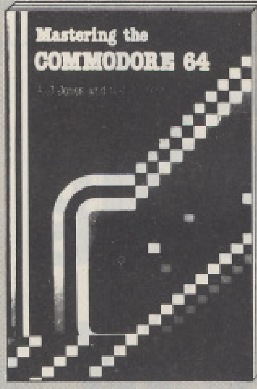
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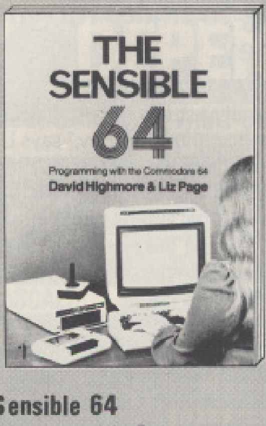
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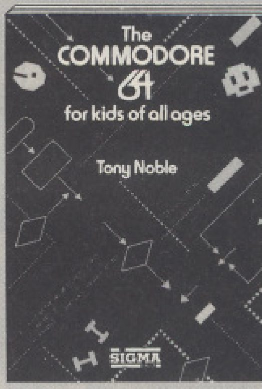
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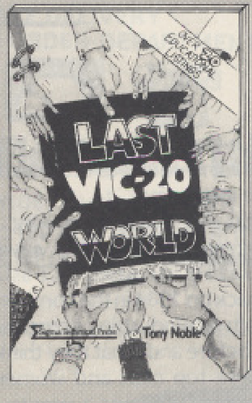
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Defining '84: "a year of reality"

Viola Gienger talks to leading executives about the successes and failures in the computer industry and within their own companies over the past year

"Nineteen eighty-three was exciting. Eighty-four was memorable. Eight-five will be interesting."

Martin Maynard, managing director of Audiogenic, expressed the views of many of his counterparts when CCI asked them to look back on 1984 in the computer hardware and software industries, comparing it to what came before and what they think will follow. For these top men and women in leading companies, 1984 was a year to face facts – hard statistics that told them they had better get serious or step aside.

"The computer as a toy has seen its day," Maynard says.

At three-year-old Quicksilva, creative design executive Mark Eyles says,"The way it's (the computer) entered the market and been presented, is almost as a glorified toy. But they're more than that."

Precision Software's Nigel Lavit-Turner agrees for the most part that interest in games may be declining, but he isn't ready to write them off all together. "I don't think that games have had it, but I think people want some serious software."

Serious software for what industry leaders see as an increasingly serious clientele – just one of the ponderous reflections CCI heard about how the year treated the companies and the market in general. Surprisingly, or perhaps not, many of the comments were similar – demand for games is leveling off, consumers are getting smarter and thus more choosy and so forth.

The message to computer profit seekers is clear: shape up or ship out!

programmer and man in charge at Llamasoft.

Maynard says, "In '83, virtually any software you made sold. In '84 it didn't."

Maynard stresses that the problem was not necessarily quality of products but the number of options available to the consumer. The Guild Of Software Houses (GOSH) estimates that more than 500 companies dotted the software map just one year ago. This year the figure is more like 350 and it's likely to slip even further in 1985.

The result may be a greater percentage of large companies and a fizzling of the smaller ones in the years to come. Geoffrey Heath of Activision (UK) sees specialization as a hope for the small fry. "A lot of them will turn into design houses and the larger companies will do the distribution and marketing and get the games from them."

Despite the possible threat that poses to themselves, most industry leaders feel the trend is long overdue.

"Too many companies trying to make too much money"

"I think it's just too many companies trying to make too much money," says Llamasoft's Jeff Minter, whose profits in 1984 weren't quite what they were the year before. But enormous profits aren't Minter's raison d'etre and he says he has not been disappointed. "I'm not really in the market the same way as a lot of people."

But whatever the future holds is affected by the past, in this case 1984 and prior. Information technology consultants, EIU Informatics, reports sales of hardware in 1984 are estimated to have reached £138 million compared to £107 million for 1983. In the software industry, sales are expected to total £229 million – up nearly 77 percent over the previous year.

But even those figures are nowhere near that expected by most companies who had hoped for doubled or trebled sales this year.

"Consumer demand has slacked dramatically"

Attributed to a combination of warmer than usual summer weather, the coal strike and the over-the-peak phenomenon, consumer demand has slacked dramatically.

"It's been a more realistic year," says Christine Laugharne, sales director for Melbourne House.

Realism was a recurring theme in our chats with the decision makers.

"I think the year has been a year of reality," says Heath. "The industry is a year older and a lot wiser."

Manufacturers are finding their distributors more cautious, their retailers more selective and their public more choosy than ever before.

"There's no point releasing software unless it's new and extra special," Laugharne says. "There's so much out now."

Nick Alexander, managing director of Virgin Games and GOSH chairman, says many sales at the end of 1983 went to new retailers stocking their shelves. Unfortunately the "one-off boom" couldn't go on indefinitely, and it didn't. The result was a crash that caught the market unaware.

"What 1984 has done is to make the software market look a lot more a seasonal market than in '83," says Alexander, who is seeing a reflection of the video market's disillusionment some years ago in the computer market now. "I think there's much more realism in the industry than there was last year. But I'm surprised how fast it has happened."

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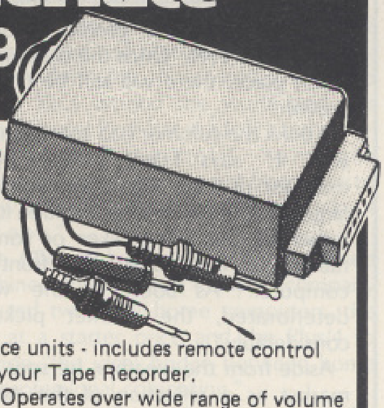

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"There will still be underlying growth"

Alexander doesn't predict doom and gloom, however. "Once the shaking up has taken place, there will still be underlying growth."

"I think the summer had something to do with it," says Frank Coward, general manager of Stack Computer Services. "A larger part of our market decided it would rather be out riding bikes or something rather than indoors sitting in front of the computer. "As soon as the weather deteriorated, the market picked up considerably."

Aside from the weather, he sees the UK market as a reflection of the American computer industry. "I feel we're following in the path of the crash there last year. There's definitely been a bloodbath among manufacturers."

It may be, too, that the market simply got smarter. Many companies have had to grow up with the consumers. No longer amazed at computers, the public is giving orders now rather than merely taking what they're handed on a less-than-silver platter. They want better quality software, more exciting games, more elaborate graphics, more sophisticated software.

"Five and a half years ago when we started out we sold a lot to hobbyists who just wanted the stuff," Coward says of Stack. "They actually demanded they have it no matter what it looked like, packaging or whether it had a proper manual."

"The public is more educated"

"The actual public has been more educated," Handic's managing director, Terry Taylor, says. "I think it'll start getting more selective."

The new realism in the industry could be a reaction to the same at the consumer end. "I think there has been a great deal of disillusionment," says Pearl Wellard, co-founder with Peter Calver of Supersoft. "They've (consumers) realised that this machine just sort of sits there in the corner unless you program it yourself which takes a lot of time, or spend a lot of money on software."

On the other hand, the trend toward budget priced software may not be the answer.

"The fall in prices is not necessarily good for the consumer," Calver says. "It means the percentage of money spent by the consumer that is going to find its way back to programmers and software houses is going to be less and less, and that's the money put into software development."

Sandy Marchant, managing director of Bubble Bus Software, says the better educated public must be met by better quality software.

"Very few people (in the industry) seem to have a real computer background. Many of them work on marketing."

The economy has also played its role in 1984. With unemployment soaring and the coal strike lingering painfully on, consumers may have been reluctant to spend their precious pounds for fear they may need the money this winter.

"There's been a reduction in the amount of money people are prepared to spend," Coward says. "The spending power of everybody is affected. The Christmas boom had started by (late October) last year, but it hasn't this year."

Precision Software's Nigel Lavit-Turner says more disposable income in the United States has given his company an edge there that it hasn't achieved in the UK. "There doesn't seem to be the demand for the more serious and professional products in the UK."

Precision has sold more of its Superbase 64 disk-based database, for example, in the US because nearly every 64 owner also has a disk drive. In the UK the ratio of disk drives to 64s is about one for every three.

"It's probably a matter of spending. There's more disposable income available in the States."

Despite the less than excellent market in 1984, companies now are looking to the next year. Perhaps a bit chagrined, they will likely take caution with their products in the future, fearful of being burned again.

"I don't think any software companies have made any money so far this year," Virgin's Alexander says.

"Survival of the fittest"

The lessons of 1984 have been difficult ones but valuable, too, for those relatively few companies who pass the test of the fittest in the hardware and software markets and manage to survive the natural gleaning.

So where does this leave Commodore? Having introduced two new machines in 1984, CBM is trying to revive the enthusiasm that came with the release of the 64, considered in the industry to be one of the best, if not the best, personal computer for the greatest variety of uses.

But the introduction of the C16 and the Plus/4 has met with mixed feelings in the rest of the industry.

"The only thing the Plus/4 has to offer is a spreadsheet and a database," says Audiogenic's Maynard. "As for the C16, it'll be interesting to see if the public is prepared to take a machine without chart capability. They have nothing to give that is really outstanding, but maybe they have something up their sleeves that we don't know about."

Indeed, Commodore has hinted about new ideas in the wings but no specifics have been released.

Calvert is not quite so pessimistic about the 16, which Commodore is pushing as a beginner's package similar to the marketing for the VIC 20, which the company stopped producing in September.

Impressed with the 16's graphics, high resolution, sound capability and 40 column screen, Calvert is not daunted by the mere 16K memory. "We think the Commodore 16 is an excellent machine and we think it's going to be successful ... I think a lot of people are going to be tempted to buy the 16 for business use."

Just as the whole is all of the parts, the computer industry is all of the companies that push it forward. The effect of the sales slump was not lost on the individual manufacturers, but a bevy of quality products nevertheless managed quite well in the market.

"Games continued to dominate in sales"

Games continued to dominate in sales, but applications software carved a firm place for itself with many companies scrambling for that special something that would make the year.

Here top executives talk about their own companies' products, successes and failures during 1984.

ACTIVISION

The UK arm of the American-originated Activision launched its first ventures into the computer software market in late summer 1984 and managing director Geoffrey Heath says the best products so far have been the games Ghostbusters, Decathlon, Pitfall II and Hero. Already Activision has released 12 new products onto the market during the year including Ghostbusters, its newest offering based on the soon-to-be-released film of the same name.

Zenji and The Designer's Pencil are another two of Heath's favourites, but he calls them "growers", saying they are "going to take a while for people to figure out."

AUDIOGENIC

The Magpie database and Swift spreadsheet are the best Audiogenic releases of the year, according to managing director Martin Maynard, who says their sales figures each have exceeded the 5,000 mark. But the numbers still are not as high as those for computer games, specifically Frantic Freddie and Alice In Videoland, each of which have sold more than 25,000 copies.

Maynard says demand for Commodore VIC 20 products dropped off dramatically at Audiogenic after Commodore's de-emphasis of the machine this year. Reshifting the prospects, Audiogenic began to focus on peripherals including the Wafa Drive and Koala Pad graphics tablet.

"The market collapsed," says Maynard, who is looking at company sales that barely exceeded 1983 rather than doubling as projected.

BUBBLE BUS

Sandy Marchant saw a similar trend at Bubble Bus Software where the Hustler game (also on the HesGames label as Pool Challenge) is expected to reach sales of 35,000 by the end of 1984. Marchant says Hustler has recorded consistently good sales throughout the year despite the overall slump in the market. "It has been very slow I think really because we're comparing them (sales) to last year."

Marchant attributes the success of Bubble Bus to the programming knowledge behind the three men who run the company – all ex-programmers themselves. "We write virtually all of our games in house," he says. Marchant estimates the company released from six to ten titles in 1984, of which 95 percent were done by company programmers. The firm has been established about six years but took on the name just two years ago.

Sandy Marchant, Bubble Bus

Quadrillion was another good seller, including the Word Wizard word processor, a stick label printer and message display to start the company's venture into more serious software. With two of eight programmers working solely on material for the Commodore, Marchant says, "We're certainly happy with where we are now."

HANDIC

Appealing to the business market this year, Handic Software has made inroads with the spreadsheet Calc Result, a product developed two years ago but marketed by Handic only this past year.

Managing director Terry Taylor says Handic still recorded "worse than expected sales" for 1984 despite its new releases which included an RS232 interface and a range of disk-based games.

Handic has been in the UK since November 1983 and in the past year released five new games with five more expected soon.

Taylor says the fact that the games are in disk form is in line with an effort by many software houses to prevent widespread and costly piracy. "The software houses are actually losing money," he says.

COMMODORE

Howard Stanworth, Commodore

"If I say that in 1984 we broke all records by topping sales of £100 million in the UK, I think that sums up what kind of a year it's been for Commodore," says Howard Stanworth, general manager for the UK arm of Commodore Business Machines, about this dramatic year in one of the personal computer industry's international leaders.

"Add to that the fact that we have now opened our new manufacturing operation in Corby and are producing around one computer every five seconds and you have a fair idea of Commodore UK's remarkable and unparalleled growth over the last twelve months."

Commodore gives much of the credit for its success to the 64, which was introduced with great success in Great Britain in 1983. Worldwide, CBM estimates the machine holds around 60 percent of the world home computer market. "Readers can rest assured that it will remain our number one selling computer for a long time to come."

The company also grants its VIC 20 a share of the limelight of success, Stanworth says. "Commodore has now sold over two million VICs around the world and our unique Starter Pack has made it a truly staggering success here in the UK – so much so that our competitors have not been slow to follow our lead and produce similar packs of their own."

But CBM did not rest on established machines alone. During 1984, the company released two new home computers, the C16 at a starter price and the Plus/4 to provide "the ideal bridge between home and professional computing."

Stanworth calls it "the core of the Commodore philosophy." "In short, this philosophy is about designing products to meet demand," he says. "There's no point in selling one computer and expecting it to be all things to all men. You must be able to offer a range to meet the varying needs of different people. That's why we launched our new home computers – to broaden our product base and ensure that, no matter what the customer wants, we have something to offer them."

Stanworth also says software is more important than ever in Commodore's role in the computer industry. Among the best products he named for 1984 were International Soccer, Spirit of the Stones and Music Maker.

The company also boasts of its new communications modem which, priced at less than £100, gives access to the Compunet database and allows the user to make the 64 a Prestel terminal that communicates with other terminals. "We are ensuring that interactive communications is within the grasp of any home micro owner."

LLAMASOFT

Revenge of the Mutant Camels was the highlight of the year for Llamasoft's Jeff Minter, all-in-one founder and programmer for the company. Having racked up a total of five new games for Commodore machines in 1984, Minter says he is satisfied with his position in the industry although the money wasn't quite as good as the previous year.

"It doesn't really bother me as long as I can make a living at it," he says. "I've got a fairly good following and I just want to keep them happy. If anybody else joins in, that's fine."

Sheep in Space and Ancipital were also among his favourites because of their complexity. "I'm not finished with 1984 yet."

MELBOURNE HOUSE

Christine Laugharne, Melbourne House

Traditionally book publishers, Melbourne House has made its presence known in the computer software market over the past two years. Sales Director Christine Laugharne says the adventure game Sherlock for the 64 has hit the company's number one spot this year with sales "well into the five figures," reflecting a general trend toward adventure games for the public.

Working mostly with its own programmers, Melbourne House has released 30 books and software products for Commodore machines alone and 40 more items for other computers, totalling about twice as many new releases as in 1983. "We do quite well with books like disassembling your ROM and ones like that."

Nevertheless, the year for Melbourne House was "leaner than we expected," Laugharne says, though sales still were well above the previous year's figures.

"It was much flatter during the summer and there was the crash after Christmas last year," she says. "It's a funny business isn't it? It changes so fast."

PRECISION

Superbase 64 was a blockbuster for Precision Software, selling about 55,000 copies so far, according to finance director Nigel Lavit-Turner. "At 20,000 it passed the million dollar figure."

But many of those sales have been in the United States, he says, with 2,500-3,000 sold each month there, compared to 700-800 per month in Europe. "The UK has not been as good as expected," he says. Contrary to the findings of many of his counterparts, Lavit-Turner says, "There doesn't appear to be the demand for more serious and professional products in the UK."

Availability in eight languages is one of the major reasons for the large sales of Superbase abroad. "We have had large contracts in North America because of the French and Spanish," Lavit-Turner says. "I see America continuing to be a key market, but I think people are looking for better quality. They actually want something to give them a solution, really."

QUICKSILVA

Mark Eyles, Quicksilva

Three-year-old Quicksilva has been supporting the 64 with software for the past year and creative design executive, Mark Eyles calls it an inevitable move "because it's a big machine."

In terms of the company's big games for 1984, "If we include the Christmas period, one is Summer Games," he says. "The other one is Ant Attack."

The most significant development for Quicksilva, though, is its purchase by British Electric Tractor Company – a move that Isles says will give the company a firm grounding for the future. "For the actual stability of the company in what is obviously a volatile market, it gives us some backing."

ROMIK

One of the priorities for Romik Software this year was narrowing the brand range of computers for which the company develops software, says managing director Mike Barton.

Among those that fell to the axe were Lynx, Dragon and Atari "simply because the computers were not achieving the penetration in the market that we wanted," Barton says. For the many machines remaining on Romik's list were games such as The Great Nordic Wall and software such as the Multisound music synthesiser. Barton won't release a specific figure but says each item sold "enough to make us happy".

While the retail value of most software dropped by about 30 percent from 1983 to '84, Romik also secured a promotional agreement with Weetabix Ltd. The cereal manufacturer advertises on each of its 14 million boxes distributed, a Weetabix game developed by Romik along with a competition.

The only significant disappointment in '84, Barton says, was VIC 20 software sales though even those picked up near the end of the year with two newly released games outselling 64 products by 30-40 percent. "There has been a shortage of new VIC 20 software this time of year," he says.

SUPERSOFT

"You can't ask for a better endorsement," says co-founder Peter Calver of Supersoft, which in 1984 brought out its Mikro 64 micro assembler cartridge now used by many of the company's competitors.

Despite a price of £57.50, Supersoft has sold more than 1,000 Mikros along with about 18 other new programs. Considering the same summer slump experienced by most software houses, 1984 has been "a period of consolidation," Calver says.

"People found they had in stock products that just weren't selling mainly because of out of date technology," Calver says. Despite a record of consistent profits improvement, this fiscal year reaching from May to end April may not be quite the same for Supersoft.

"For the first time, 1984-85 may not be up on the previous year, but it will still show a profit."

Calver's partner, Pearl Wellard, says the year was "one of great change. I think we're finding or trying to work out where the market's going. We had a large bubble last Christmas and it kind of burst afterwards."

STACK

A broad range of peripherals for use in industry as well as the home gave Stack greater protection from computer market trends in 1984. General manager Frank Coward says, "We're fairly secure from the peaks and troughs."

Their new products numbered 12 this year, equal to the 1983 offering. The Liverpool based company, now five and a half years old, has added a light rifle and a light pen for the VIC 20 and 64 to its line among other home-scale products.

"Joysticks were big in '84," says Coward. The company answered the demand with the Zap Proof Joystick. Stack also continued its emphasis on programmers' aids, a type of product Stack has found much in demand.

VIRGIN

Nick Alexander, Virgin

Nick Alexander, managing director of Virgin Games, says his company is "hanging on to see what the Christmas season brings."

But there was no lack of achievement at Virgin. For Commodore machines, Alexander considers the newly released Falcon Patrol II and Sorcery as the best releases of the year and they are expected to be big sellers for the holidays. "The 64 at the moment, looking worldwide, is the best machine."

He says one lesson Virgin Games has learned is that, for a product to be successful, "it has to be something that is approachable for someone who doesn't know a lot about the way the computer works.

"The things that are needed are things that make computing accessible to those who are shut out at the moment."

Dear Editor...

Dear Editor

I am writing to ask your advice and/or assistance concerning the program 'By all Accounts' in the September edition of CCI.

After laboriously typing in what is, after all, quite a long program listing, I find that the program stops with an "undefined statement error in line 5800" message. When I try to list the offending line, it appears to have disappeared – as do all lines after 1490! However, a command to "list", with no specific line number mentioned, produces a complete list of the program.

I have checked the program against a printout and have tried typing the lines containing errors, but this does not work out, since the retyped lines appear in an individual line listing, whereas the old version appears in the complete program listing.

Can anything be salvaged? Incidentally, can the THEN65535" in line 5730 be right?

As a novice in this business, I should very much welcome your help.

J A Ormesher
Barnet
Herts

It sounds like the program has been corrupted somehow, so I'm afraid it means retyping the program. Concerning your other query, "THEN65535" never happens!

While on the subject of the By all accounts program, we have discovered a couple of problems. In line 1210, CR$3CHR(13) should be changed to CR$=",". And in the same line, SO=1 should be changed to SO=0.

In line 4400, delete ;CR$; from the end of the lne. We apologise for any inconvenience and frustration this may have caused.

Dear Editor

In a number of your Machine Code routines and programs you use a BYT instruction which does not appear in the CBM64 reference guide instruction pages. Could you please explain its operation.

Is it that my 64 is an old model or is the problem with my assembler. I heard that Commodore made some modifications with the more recent models. Could you explain these. I've got an idea that the difference is in the assemblers, if so would it be possible to make up a chart of standard and equivalent instructions between the more popular assembler packages.

PS What assembler does you magazine use?

B Coburn
Hackney
London

Firstly, the BYT is a marker for a non-6510 instruction, that is, it is data and should be entered via the memory display of the monitor.

Secondly, the modifications have been made to the Kernal of the machine. This has eliminated the old bug in screen editing due to the linking of lines. Now all you need to do is POKE to screen and the character will appear straight away.

We have had a number of enquiries about assemblers and are planning to publish a feature on this subject in the near future.

And finally, in response to your PS, for most routines CCI use the MIKRO 64 assembler

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Dear Editor

I would like to congratulate you on your excellent magazine. From working within an industry which is showered with printed nonsense monthly, it is a great relief to read Commodore Computing International.

As the only high street magazine I know of that also relates to the trade as well, I urge you to keep up the good work.

Andy Shafte
Microdealer UK Ltd
Welwyn Garden City
Herts

Dear Editor

I am writing to you in sheer frustration and for your possible clarification.

I have been attempting to copy the Scrabble program, as detailed in your Vol 3 No 3, to tape but unfortunately have not yet been able to do so.

I have a 64 and have copied religiously every line, but keep incurring either ?SYNTAX ERRORS, or REMID D ARRAY ERRORS, as I progress. I am sure it's not the processor as I have inserted several "test" programs as detailed in the Commodore handbook.

Could it be that the program in the magazine is wrong? Please assist as it really is most frustrating.

J McRobert
Horton Heath
Nr Eastleigh

We can only advise that you recheck your typing as the program listing is correct.

However, we have discovered a misprint which does not relate to your problems, but which may cause problems to other readers converting the Scrabble listing to run on the 64. In the text preceeding the listing, line 340 should read POKE53281,6:PRINT"(CLS)" :POKE53281,1. This will eliminate the problem of letters not appearing on the screen.

Dear Editor

I have a PET 8096 with 8050 dual disk drive and 4022 printer. Whilst I have business software, much to the annoyance of my children, games are out of the question.

Could you please advise me as to how I could either add some software to my existing machine to enable games to be played or advise me as to the economics of interfacing a 64 or VIC with what I already have.

M R Hermann
Walgrave
Northampton

There are still games available on the market for PET's. Supersoft have a range of around 40 games on cassette and disk. Arcade games range from £6 to £10, while adventures are more expensive at between £10 and £20. You may be interested in Supersoft's 'First Eleven' – a compilation of 11 arcade games on disk. Or if your children still enjoy Space Invaders, it is available as a chip for £19.95.

Supersoft
Winchester House
Canning Road
Harrow HA3 7SJ

It is not clear in your letter if you already own a 64 or VIC. If you do, both can be interfaced to your PET using the Interpod interface (59.95), now available from Cheetah Marketing, 24 Ray Street, London EC1.

Do you have a problem? If you have a technical query or advice to other readers, drop us a line at:

QUERIES,

Commodore Computing International,
Finsbury Business Centre,
40 Bowling Green Lane,
London EC1.

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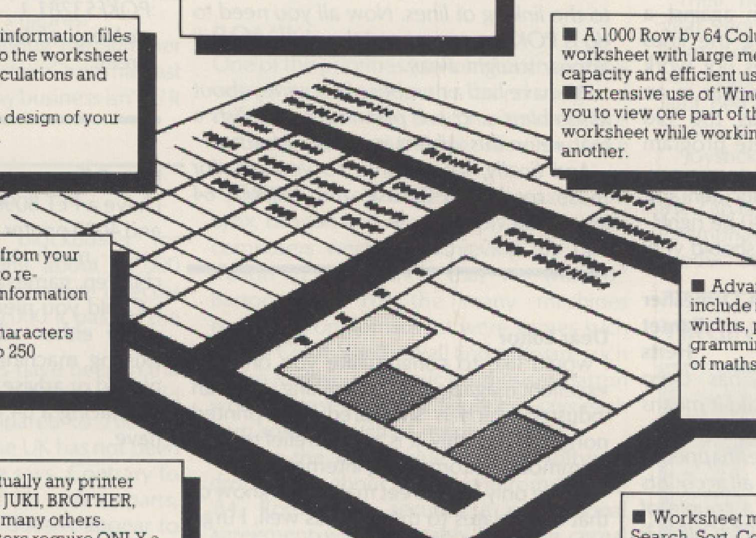

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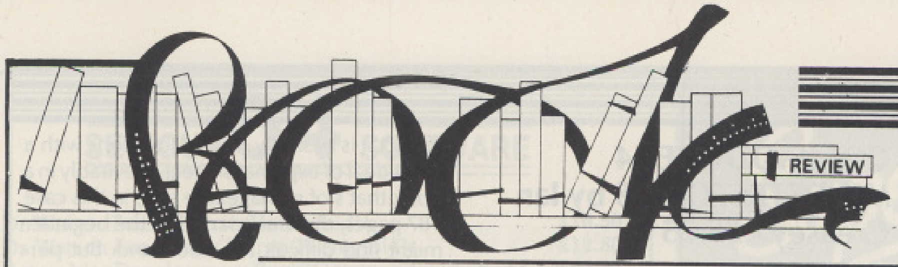


Computer journalist Peter Arnott-Job evaluates a selection of newly-released computer books.

THE CREATIVE COMPUTER by Donald Michie and Roy Johnston - £12.95

This is an important book so there are no apologies for keeping the reviews of the other books short to fit in something meaningful about The Creative Computer. Even so it would be impossible to do the book justice (or injustice, depending on your attitude to the reviewer's opinion!) in just a few hundred words.

The authors argue for a new approach to computing in general and Artificial Intelligence (AI) in particular. The book challenges the reader to think about the future in a world that might be dominated by computers. The question we should be asking ourselves now is 'What sort of computers do we want?'

What Michie and Johnston seem to want is computers with more human attributes. They see a grim future if we carry along our present path, building bigger and more complex calculating machines. Instead of stuffing our computers full of information and devising ever faster ways of manipulating that information we should start thinking about knowledge. It's knowledge that places humans above computers. The machines have the ability to store much more information and to process it much more quickly than a human brain but it's knowledge that makes the difference, they say.

When I picked up this book I was prejudiced against it. More blind worship of the great god technology, I thought. We humans have failed so let's hand over as much responsibility as we can to the machines. The first couple of chapters seemed to confirm this view. Especially in the light of the introduction in which the authors claim that the message of the book is that computers can solve the serious problems of the world – many of them caused by technology.

The spread of home computers has been enlightening in one way but in another has restricted people's imaginations. Those of us who are using them are discovering miracles of technology. But most of us don't bother to think about how computers do what they do. There's a danger that the current path of computer development will lead to a world full of immensely powerful computers that run our lives but which we don't understand. That's perfectly possible, argue the authors, unless we think responsibly about the subject now.

Personally I have a great many grave doubts about AI. Even after reading The Creative Computer I'm not convinced that it's possible.

There's one aspect of computers that has always worried some people. No matter how sophisticated, a computer can only work with numbers. Everything must be reduced to numbers. Michie and Johnston make the odd reference to the late Arthur Koestler. The basis of his criticism of the scientific establishment was the tendency of all the sciences to reduce everything to numbers. This 'reductionism' is an attempt to attain true objectivity.

Koestler's argument was that you couldn't really understand anything by reducing it to numbers. He argued for a holistic view of things – looking at the whole rather than the parts. Incidentally, anyone who's listened to the Police albums Ghost in the Machine and Synchronicity ought to have an idea of what Koestler was getting at.

The possibility of Artificial Intelligence poses all sorts of questions – not least moral ones. Can numbers cope with moral questions?

AI implies a human-like machine capable of creativity and originality. It is generally acknowledged that an essential quality of human beings is our ability to make mistakes. Perhaps creativity is inseparable from fallibility. Would we be able to build machines that made mistakes – and would those mistakes always be the right ones? Michie and Johnston point out that expert systems in current use make mistakes and that this is essential if they're to work properly.

In order to make progress towards AI we need to understand more about how the human brain works. Unfortunately research into the subject is carried out by reductionist scientists. We may eventually understand how the parts work but will this necessarily lead us to an understanding of how the whole thing works?

The more controversy that The Creative Computer stirs up the better. Now is the time we should be thinking about the implications of Artificial Intelligence. Waiting to see what happens is not good enough.

The proposition in the introduction that the creative computer could solve a great many of the world's problems is an interesting one. But the truth is that we could already do a great deal to solve those problems. Enough food is produced to ensure that starvation in Third World countries is greatly alleviated, if not eradicated. The will simply is not there. Would we use the creative computer to solve such problems? Or would the problems we ask it to solve be concerned more with improving our own lot at the expense of the survival of others? Why should the creative computer change the nature of man?

The Creative Computer is a thought-provoking book. I violently disagree with some parts of it but it's a book that should be read by the general public and not just those interested in computers. For the latter it's compulsory reading. If you want a say in what the future's going to be like this is the sort of book you ought to read.

Contact: Viking, 536 Kings Road, London SW10 0UH.

ANIMATION, GAMES AND SOUND FOR THE VIC-20 by Tony Fabbri - £16.15

I'm afraid we're also thought of as children by Tony Fabbri, author of Animation, Games and Sound for the VIC-20. Perhaps the book was meant for children but it doesn't say so. In this case it isn't the text which is patronising but the ideas. This is the editor in his foreword: 'What can you say about a book with program titles like One Eyed Gorilla Moving Left, Bee Flying Right to Flower, Stationery Creature Making Faces...'

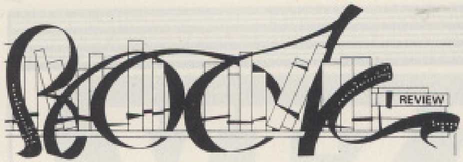
One thing you can say is that although the program names are stupid (did he have to give them names?) the intention is good and they achieve the desired result.

The programs accompany a text which is basically a step-by-step guide to Basic on the VIC-20. By the end of the book the beginner ought to be able to write fairly complex games programs.

Contact: Prentice/Hall International, 66 Wood Lane End, Herts HP2 4RG.

THE COMMODORE 64 COLLECTION by Roger Valentine - £4.95

So many of the books that arrive in the offices of CCI seem to have been written for children – even those written for adults! Surely there must be a way of making the subject of computers understandable without resorting to painfully patronising writing and childish gimmicks?



One can't help feeling that almost every book that contains a collection of programs is really meant for kids even when, as in The Commodore 64 Collection, a chapter with the heading Kids' Stuff is subtitled 'Not necessarily stuff for kids'. Some of the 50 programs are useful routines but most are games. The programs are not incredibly sophisticated or long but they should teach anyone keying them in a great deal about programming a Commodore 64.

It's a measure of how much computer book publishing has improved over the last year that most program books now contain an explanation of the program and how it works.

Those books full of listings and nothing else seem to be gradually disappearing. The Commodore 64 Collection would make a useful addition to the library of anyone who feels starved of listings, especially the beginner. Since most of the programs are short and some only 20 or 30 lines long, it's an ideal book for anyone who wants to make their 64 do something but is lacking in patience.

Contact: V&H Computer Services, Mayfield House, Spencer Street, Bognor Regis, West Sussex PO21 1AP.

COMMODORE 64 MINDSTRETCHERS by Ian Creasey - £6.25

The same goes for Commodore 64 Mindstretchers, another book of programs with explanations. The format is similar to The Commodore 64 Collection but there are 10 less programs. Perhaps this is balanced by Ian Creasey's ideas about how you can customise the programs. This book is written in a more straightforward style and therefore comes across as less childish.

A major criticism of both the Commodore 64 Collection and Commodore 64 Mindstretchers is a repeat of the criticism published on these pages last month. In order to key in the programs comfortably you need to break the spine of the book to lay it flat.

Contact: Sigma Press, 5 Alton Road, Wilmslow, Cheshire.

THE MASTER MEMORY MAP FOR THE COMMODORE 64 by Paul Pavelko and Tim Kelly -£4.95

The most wide ranging book so far, The Master Memory Map for The Commodore 64 is a book that would be a useful addition to any 64 owner's library. As you might expect it is basically a list of locations with a great deal of explanatory text. Inevitably in a book that's of manageable size, in this case 187 pages, there are parts that the beginner might find difficult to understand. But perseverance should get you there in the end. Even the experienced programmer should find a use for it even if the humour of the cartoon characters Professor Von Chip and the friendly alien Prototype is irritating rather than, as the Prelude (sic) claims, productive.

Contact: Prentice/Hall International, 66 Wood Lane End, Hemel Hempstead, Herts.

GRAPHICS GUIDE TO THE COMMODORE 64 by Charles Platt - £9.95

One could say the same thing about Graphics Guide to the Commodore 64. It's a fairly exhaustive look at the subject and if you're really interested in graphics it's an excellent book to start with.

The author is honest and emphasises the specialist nature of the book. So many books falsely claim to teach you to be a complete programmer that it's refreshing to find one that doesn't! A very useful book for the beginner or for those with a little programming experience who want to learn more.

Contact: Sybex, Unit 4, Bourne Industrial Park, Bourne Road, Crayford, Kent.

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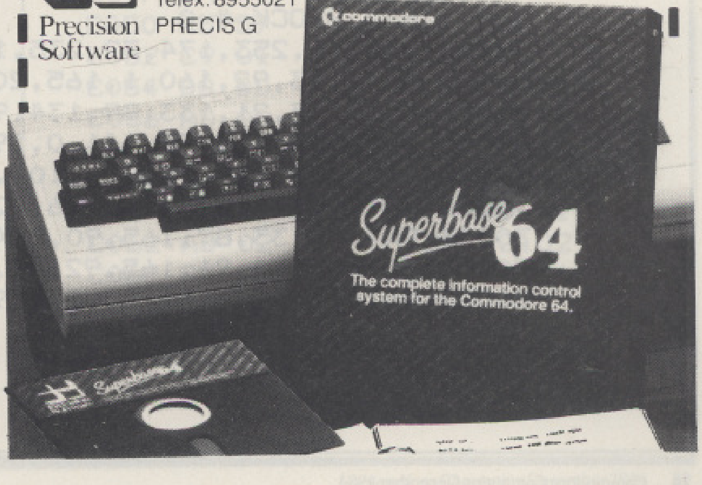
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Basic extensions

One topic that seems to produce an inordinate amount of mail is that of Basic extensions. Packages like Simon's Basic, BC Basic, et al, are all very well, and perform satisfactorily, but precisely how do they work? In other words, how have people gone about adding commands to Basic in the way that those two packages (and others) do? Pete Gerrard throws some light on the subject.

There are a number of ways in which this can be done, but for the purpose of this month's issue we'll tackle one of the easier methods. Needless to say it involves some machine code, but, as a wise sage once said, don't panic. You don't need to know anything about machine code in order to quickly start adding your own commands to Basic.

Basic Requirements

Life is made a lot easier if you have to hand an assembler of some sort, and the listings given here were prepared using the popular public domain program Extramon (sometimes known by its alter ego as Supermon: you'll believe a mon can fly). This was first published in this magazine back in late 1982, although it has also appeared in many other magazines and books.

Failing this, any sort of assembler will do, but if you don't happen to have one around, there is also a Basic program listing to provide the equivalent facilities of the machine code one. The only drawback to operating in Basic here is that it makes it much more difficult to alter the program.

Another useful thing would be a Commodore 64 memory map, and a decimal to hexadecimal convertor.

The memory map is required because we're gong to be using some of the 64's internal ROM routines. No point in re-inventing the wheel: if the code's already in there you might as well use it. We also need to know where to store various values, and here again the memory map is vital.

The decimal to hexadecimal (and indeed vice versa) convertor is required whether we're working in Basic or machine code. As we'll see later, numbers greater than 255 have to be split up into two component parts, and our convertor will come in useful here.

Aims of the exercise

The listing as presented here adds a very simple command to Basic, and takes the syntax:

A=49152:SYS A,B,C,D

Where A is the start of the machine code routine, B determines what the border colour will be, C determines what the background colour will be, and D determines what the ink colour will be. Simple enough, but the routine is very easy to adapt to other purposes, as we shall see.

There are a number of things to consider before we can begin producing the code. First of all, we need some sort of check on the parameters that are entered. The user must only be able to enter numbers between 0 and 255 for the variables B, C and D, and he must only be able to enter three variables: no more and no less.

We need to determine where the 64 will store those variables in memory, and we further need to know where to put store the results of those variables.

The Basic listing

This takes the form of a collection of data statements, which are read in and POKEd into the spare area of memory starting at location 49152, or $COOO in hexadecimal.

```
SIMPLE COMMAND ADDER IN BASIC


10 FORI=0TO143:READA:POKE49152+I,A:NEXT
20 PRINT"DATA NOW IN PLACE."
30000 REM BLOCK # 0
30001 DATA32,253,174,32,235,183,132,91
30002 DATA133,92,160,1,165,20,133,88
30003 DATA165,21,133,89,134,90,142,1
30004 DATA193,165,88,141,0,193,136,208
30005 DATA248,169,176,24,101,89,133,89
30006 DATA201,191,144,3,76,72,178,169
30007 DATA0,133,87,165,90,164,87,162
30008 DATA0,164,91,165,92,32,241,183
30009 DATA164,87,134,90,165,90,153,2
```

```
30010 REM BLOCK # 1
30011 DATA193,230,87,234,234,234,234,234
30012 DATA165,87,201,1,208,221,173,0
30013 DATA193,141,32,208,173,1,193,141
30014 DATA33,208,173,2,193,141,134,2
30015 DATA96,0,0,0,0,0,0,0
30016 DATA0,0,0,0,0,0,0,0
30017 DATA0,0,0,0,0,0,0,0
30018 DATA0,0,0,0,0,0,0,0
30019 DATA0,0,0,0,0,0,0,0

READY.
```

As a collection of data statements it doesn't make much sense, but if we look at the machine code equivalent we can begin to unravel its secrets and determine how it works. As stated earlier, if you know little or nothing about machine code there's nothing to worry about.

The Machine Code listing

It may take up more room, but the end result is the same as the collection of data statements. If you wish to use this routine from within a program, you'll need to have a line at the start of your Basic program something like this:

1 C=C+1:IFC=1THENLOAD"ADDER",8,1

if you're using disks, or:

1 C=C+1:IFC=1THENLOAD"ADDER",1,1

if you're using tape.

```
SIMPLE COMMAND ADDER IN M/C

B*
   PC  SR AC XR YR SP
.:4F53 33 00 3B 00 F6
.
C000 20 FD AE     JSR $AEFD
C003 20 EB B7     JSR $B7EB
C006 84 5B        STY $5B
C008 85 5C        STA $5C
C00A A0 01        LDY #$01
C00C A5 14        LDA $14
C00E 85 58        STA $58
C010 A5 15        LDA $15
C012 85 59        STA $59
C014 86 5A        STX $5A
C016 8E 01 C1     STX $C101
C019 A5 58        LDA $58
C01B 8D 00 C1     STA $C100
C01E 88           DEY
C01F D0 F8        BNE $C019
C021 A9 B0        LDA #$B0
C023 18           CLC
C024 65 59        ADC $59
C026 85 59        STA $59
C028 C9 BF        CMP #$BF
C02A 90 03        BCC $C02F
C02C 4C 48 B2     JMP $B248
C02F A9 00        LDA #$00
```

```
C031 85 57        STA $57
C033 A5 5A        LDA $5A
C035 A4 57        LDY $57
C037 A2 00        LDX #$00
C039 A4 5B        LDY $5B
C03B A5 5C        LDA $5C
C03D 20 F1 B7     JSR $B7F1
C040 A4 57        LDY $57
C042 86 5A        STX $5A
C044 A5 5A        LDA $5A
C046 99 02 C1     STA $C102,Y
C049 E6 57        INC $57
C04B EA           NOP
C04C EA           NOP
C04D EA           NOP
C04E EA           NOP
C04F EA           NOP
C050 A5 57        LDA $57
C052 C9 01        CMP #$01
C054 D0 DD        BNE $C033
C056 AD 00 C1     LDA $C100
C059 8D 20 D0     STA $D020
C05C AD 01 C1     LDA $C101
C05F 8D 21 D0     STA $D021
C062 AD 02 C1     LDA $C102
C065 8D 86 02     STA $0286
C068 60           RTS
```

Let's see how this 105 byte routine works.

Machine Code explained

First of all, we start off with two jumps to internal routines, starting at locations $AEFD and $B7EB. A look at the 64 memory map tells us that this is checking for brackets and commas, and then a check on the parameters for the Basic POKE and WAIT commands, which happen to be the same sort of parameters that we're interested in. That is, nothing greater than 255, and the location to be altered (or in our case the location 49152, the start of the routine) is a valid one, which means that it lies between 0 and 65535.

A quick word for none-machine code enthusiasts here. If you look at the first six numbers in the data statements (32, 253, 174, 32, 253, 183) and convert those decimal numbers into hexadecimal, you'll see that we obtain the first six numbers in the machine code listing, namely '20 FD AE' and '20 EB B7'. Try working through the rest of the listing to see that this holds true throughout.

Now, another look at the memory map reveals that there is a spare ten byte work area in the range $57 to $60, or decimal 87 to 96. We'll make use of this area and store and retrieve some values there, which is what the next part of this program is doing.

This particular part is also getting and storing the first two values that are typed in after the SYS A call, namely the values for B and C.

These are stored at locations $C100 and $C101, although they could just as easily be stored anywhere else. This just happens to be a convenient set of locations well away from the end of the program. Now, if you look at the line beginning $C028, you'll see that we're comparing something (values typed in, actually) with $BF, or 191 in decimal. It might be better to convert this to $FF, to stop an accidental overflow error occuring and wrecking the program. To alter the Basic data statements, change the values 191 in line 30006 to 255.

If a value greater than 255 in the converted version is typed in, then the program goes to the internal ROM routine starting at $B248, which prints out an "Illegal quantity' error message.

Following on from this there's a bit more retrieval and storage, before we get to a string of NOPs (No OPeration: literally, do nothing) followed by what is probably the most important part of the program. This checks to see how many values have been typed in. The first two, B and C, are already safely stored away, and the little routine from $C02F to $C049 has taken the third value, D, and stored it at $C102. In other words, we've had one additional value typed in and stored. This is checked at $C052 to $C054. If we've had less than one value, go back and get some more, but if we've had the one then carry on to the rest of the program. Typing in more than one additional value will result in a syntax error message being printed.

The last few lines then just retrieve the values of the variables and store them in appropriate places. $D020, which is the register that controls the border colour, $D021, which looks after the background colour, and $0286, which looks after the ink colour. Try POKEing location $0286, or 646 in decimal, to see what happens.

Some more checking

As this stands, it checks the second and third variables to make sure that they're not greater than 225 (after altering the $BF to a $FF), but doesn't check the first one. This is already stored away before a check is made. So, the NOPs could now be replaced with a quick routine to:

a) take the value stored in $C100

b) compare it with 255

c) if it's greater, branch to the internal ROM routine that prints out 'illegal quantity error' and halt program execution.

And some alterations

Okay, this is a pretty trivial example. How would you go about turning it into something a bit more useful. One little routine I wrote was to take eight values, and set up a complete musical note using those values. In other words, something like:

SYS 49152, A,B,C,D,E,F,G,H

where

A=voice number (checked to lie between 0 and 2)
B=Attack/Decay setting
C=Sustain/Release setting
D=Wavelength (17,33,65 or 129)
E=Pulse width low
F=Pulse width high
G=Note frequency low
H=Note frequency high

Thus eliminating several thousand POKE commands. How would you adapt the listing given earlier to do this? Well, I'll leave that one as an exercise for you, but here's some hints.

The first two values, A and B, are already stored, and we noted that $C052 to $C054 checked for one additional value. How many additional values do we need here?

These additional values are stored at location $C102 onwards (see $C046). So, where are you going to retrieve the variables C to H from?

Finally, what locations do you need to store all eight variables in to make a noise? Don't forget to set the volume as well!

Conclusion

One of the popular weekly magazines recently published a lengthy listing that succeeded in adding an awful lot of commands to Basic by using the techniques discussed above, although they didn't explain how it all worked. By repeating the first block of code many times, and just altering the locations where variables where stored, retrieved and manipulated, it is a simple enough matter to build up such a program.

Even for you Basic lovers out there, it should be easy enough to alter the few data statements necessary to do this (with a decimal to hexadecimal convertor to hand). The only thing you'll have to worry about is splitting numbers like 53281 into two parts, since as you know you can't store a value greater than 255 in any one memory location. So to round off, here's how to split a number into two.

Divide the number (we'll use 53281) by 4096.

```
PRINT 53281/4096
13.0080566
```

Okay, the first part of our first number will be decimal 13, or hexadecimal D. Now, multiply the part after the decimal point by 16.

```
PRINT 16*.0080566
0.1289056
```

This give us the second part, namely 0, So, one number is $D0. Now repeat the process twice.

```
PRINT 16*.1289056
2.0624896
```

```
PRINT 16*.0624896
0.998326
```

So, our second number is $21 (rounding up the last calculation). In time-honoured tradition, these numbers have to be presented in reverse order as $D0 and $21, or in decimal terms 33 and 208.

Let's hope we've whetted a few appetites, and I look forward to seeing Smith's Basic,or whatever, listed in this magazine before too long.

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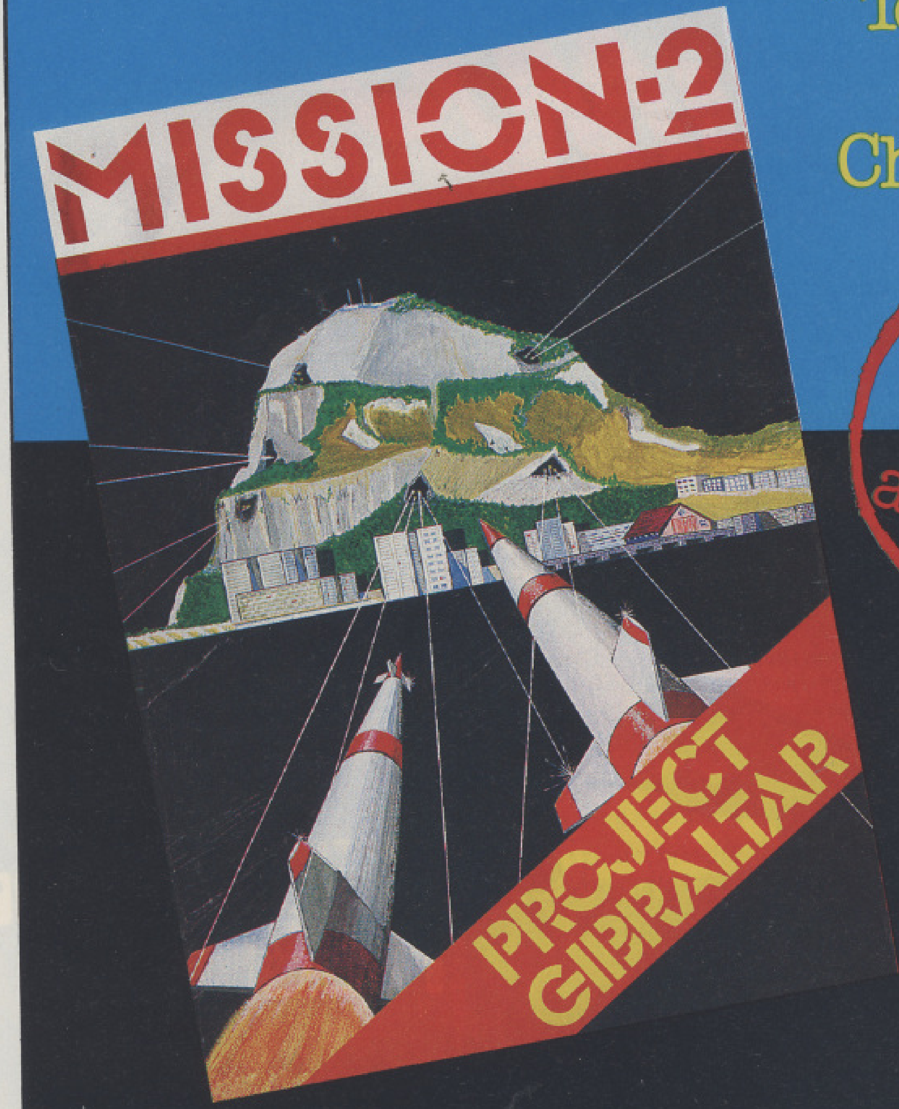

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GOLD ATTACK

Radio One disc jockey Anne Nightingale was on hand recently to mark 50,000 sales of the Quicksilva game Ant Attack.

Released last Christmas, Ant Attack is only the second game to be honoured with a "gold cassette" given to Sandy White and Angela Sutherland. One of the outstanding features of the game is 3D graphics. Ant Attack recently was released on the 64.

Contact: Quicksilva Ltd, 13 Palmerston Road, Southampton, Hants S01 1LL. Tel: (0703) 20169

LET 'EM RIP!

It may not be designed to teach driving, but the new driving simulation game from Oxford Computer Systems should be good fun for those who know how.

Called Turbo 64, the program uses 3D graphics and sound as the player sits in the driver's seat of a Formula I racing car. Scenery flashes by along the side of the road that stretches out in front of you and an instrument panel includes speedometer, rev counter, gear shift and steering wheel.

"Smell the rubber burning and grit your teeth as you tear down straights and scream into the bends," says Limbic Systems, a subsidiary of Oxford Computer Systems that is distributing Turbo 64. We're a bit sceptical about the smelling; last we heard the 64 hadn't come that far.

Contact: Limbic Systems UK Ltd, Hensington Road, Woodstock, Oxford OX7 1JR. Tel: (0993) 812700

JOIN THE SLOANE RANGERS

Melbourne House is adding two new games to its Commodore Christmas offerings — Hampstead and Castle of Terror.

Hampstead challenges the player to rise from the slums of London to eventually "attain" Hampstead, an area of North London in the borough of Camden. The game comes with a booklet written in Sloane Ranger style. Castle of Terror is a graphic adventure with more than 40 screens. Instead of the common two word commands often used in adventure games, Castle of Terror incorporates fairly complex sentences.

Available for the 64, each of the games sells for £9.95.

Melbourne House also is looking to the new year with a 64 version of the Scramble-type game Penetrator, expected to sell for £7.95, and a 64 version of the Forth computer language at £14.95.

The software publishers also are beginning work on products for the C16 and already have released a collection of listings in the Commodore 16 Games Book. It includes games to test your reflexes, your nerve, your logic, your strategy and your intelligence, Melbourne House says. The listings are graded from easy to difficult and include educational, simulation and gambling games. One perk in the book is the Chexsum verification program to speed up the program debugging by enabling the reader to identify incorrectly typed lines almost immediately.

Contact: Melbourne House Publishers Ltd, Castle Yard House, Castle Yard, Richmond, Surrey TW10 6TF. Tel: 01-940 6064

PUZZLED

If you like brainteasers and you don't mind a bit of typing, a new book of computer puzzle listings may be just the thing.

The authors of the listings in The Times Book of Computer Puzzles & Games For The Commodore 64 range from teens to members of the clergy. Submissions were prompted by a competition offering first prizes of portable computers and second and third prizes of gift vouchers.

"You've got a few programs here that probably beat those on general release," says Harold Gale, who compiled the programs for the book with Robin Bradbeer. Priced at £6.95, the book includes more than 30 puzzles and games.

First prize winner Shunting is a puzzle that has as its object to place trucks in a depot and carriages into a station. Done by the Rev. J.R. Jackson of Billingham, Cleveland, it runs with about six pages of double columned listings. Most programs in the book are a bit shorter with titles such as The Petrol Tank Puzzle, Greek Urn, Insects and Enigma.

Program listings were typeset directly from computer printouts, eliminating the possibility of error. Publishers are Times Books and Sidgwick & Jackson.

Contact: Sidgwick & Jackson Ltd, 1 Tavistock Chambers, Bloomsbury Way, London WC1A 2SG. Tel: 01-242 6081

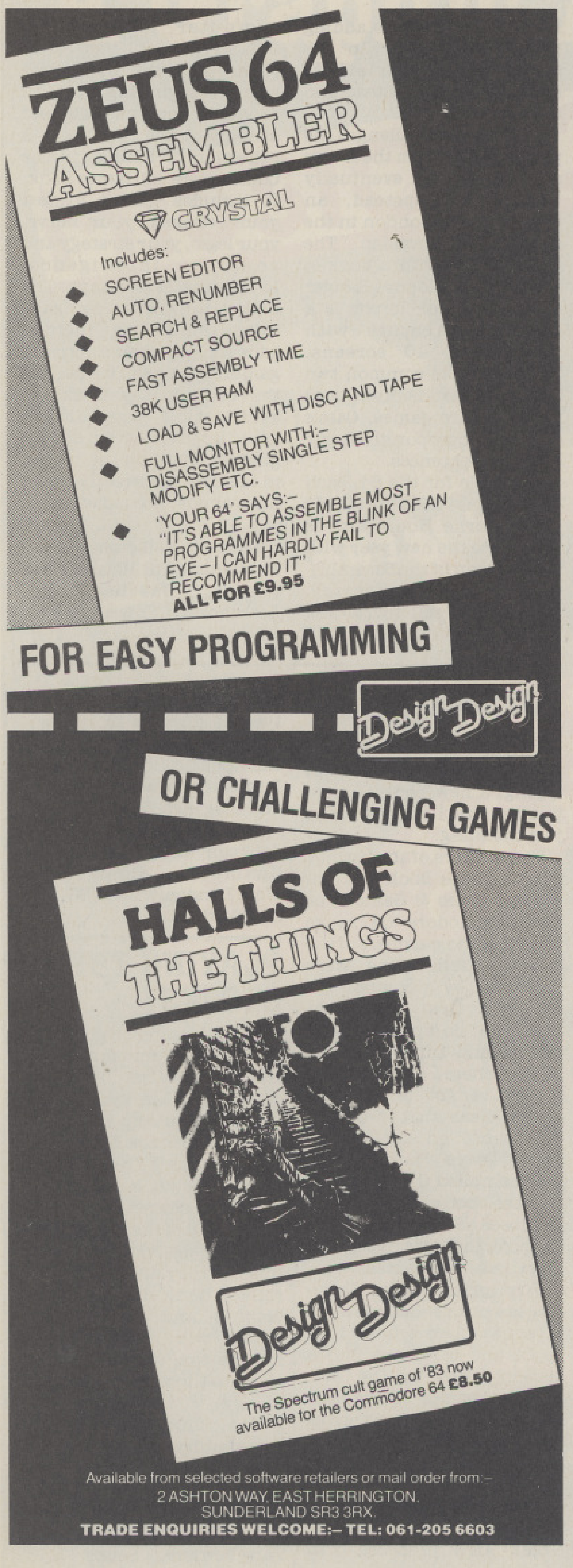
PLAYING THE STOCKS

Make a fortune or go broke with a new game for the 64 from Kuma Computers Ltd called Stock Market.

The program simulates the London Stock Exchange, Kuma says. The players receive news items about company shares with each new round of the game. They can also get advice, hints and tips but they are not always right. A bank eliminates bad debtors and, while good tactics will help to avoid income tax, super tax will swallow those with too much money.

One to four people can play this simulation game, which costs £6.95, and mathematical skills are not necessary.

Contact: Kuma Computers Ltd, 12 Horseshoe Road, Pangbourne, Berks RG8 7JW. Tel: (07357) 4335



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ELECTION NIGHT SPECIAL for VIC 20 + 8K	4.99
64 ELECTION NIGHT SPECIAL — bigger and better	4.99

PARTY 4 Four games to match to progress of your party: MASTERWORD, A DAY AT THE RACES, GAME X (Strip Poker) and CONSEQUENCES. Harmless fun (nothing offensive) but good fun.

VIC PARTY 4 for VIC 20 + 3K or more	5.99
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★ NEW ★: ADULTS ONLY Fun game for 2-10 broadminded players. Lots of cuddling and kissing, plus many other rewards and forfeits: you never know what you'll end up doing, or with whom! Nothing offensive, but you MUST be fairly broadminded.

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GOLD FOR THE COMMODORE

US Gold promises action from its two new releases, Drelbs and Fort Apocalypse.

In Drelbs, the player needs quick reflexes and a good sense of strategy to avoid evil enemies while he is building glowing squares.

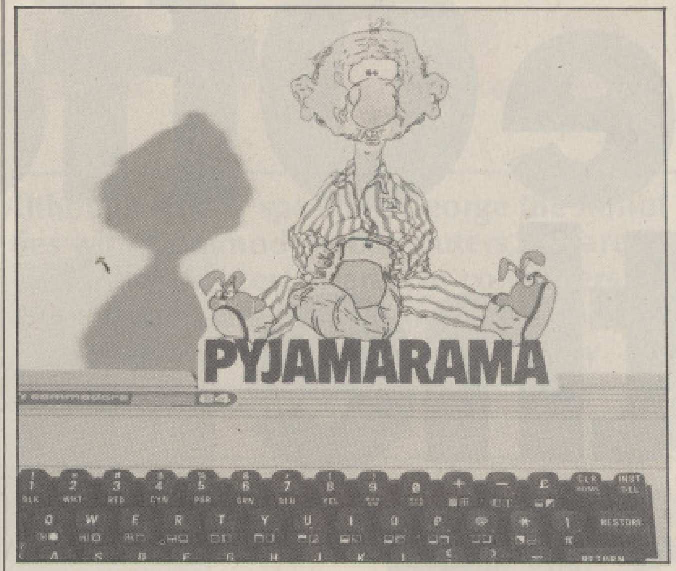
Fort Apocalypse has multiple levels with screens of hi-resolution graphics and "unnerving sounds." The player must navigate his helicopter through endless sets of caves on a rescue mission for 18 friends trapped in the fort. Equipped with deadly ammunition the enemy can be kept at bay with bombs and bullets. Hazards such as lethal laser rooms and hyper-energy chambers scrool up relentlessly, ready to destroy.

"It is impossible to learn this game, as there are so many different randomly placed dangers," US Gold says. "Each time you load the game it is a new experience.

Designed by American software house Synapse, both games sell for £9.95 on cassette and £12.95 disk.

Contact: US Gold Ltd, Unit 10, The Parkway Industrial Centre, Heneage Street, Birmingham B7 4LY. Tel: 021-359 3020.

NIGHTMARE FOR THE 64



Wally Week is having a nightmare and he's desperately trying to wake up. First, though, he must find the key to his alarm clock — no small task considering everything in his nightmare house is many times the normal size.

So goes the story for Pyjamarma, the popular Mikro-Gen game now available for the Commodore 64. Selling at £7.95 on cassette, Pyjamarama is the second in a series of games starring the spry old creature. But this time he dons his striped pyjamas and his fluffy beetle slippers to make his way through his home, jumping through doors rather than walking, for example, and picking up objects to use in his quest for the key.

Wally, to whom Mikro-Gen occasionally gives speaking ability, says "I reckon that Mikro-Gen have started something that is going to keep me and my mates busy for a long, long time, and speed my fame into associated home computer entertainment areas." In other words, a third game is on the drawing board to be released next spring.

Contact: Mikro-Gen, 44 The Broadway, Bracknell, Berks. Tel: (0344) 427317

CHILLER — IS IT OR ISN'T IT?

Mastertronic Chairman Frank Herman firmly denies a report that the computer game Chiller has been withdrawn from the market due to accusations of copyright infringement.

CCI is among many media who have received press information from an organisation called Rocksoft, said to have been formed "to protect the rights of music publishers and their copyrights." The release said Rocksoft "has forced Mastertronics to withdraw its 'flagship' game, Chiller.

"Rocksoft is the sole and exclusive agent for the original publisher of 'Thriller', the mega-selling single from Michael Jackson, in the field of home computers. The company has similar arrngements covering a wide variety of music copyrights and is working closely with the MCPS (Mechanical Copyright Protection Society).

"Mastertronic used 'Thriller' as the backing music on its game 'Chiller' without first obtaining the original copyright. Rocksoft therefore, issued proceedings which have led to the game being withdrawn and a substantial out of court settlement being agreed."

Herman says, "It has been brought to our attention that the computer sounds produced in this program are similar to the music copyrighted by Ronor Music called 'Thriller'. Therefore we have agreed to negotiate a royalty in respect of this, and to use different music in future production runs so that we don't infringe anyone's copyright."

Mastertronic says Chiller, which sells for the 64 at £1.99, is one of the eight month old company's best-selling games. But if Chiller has nothing to do with Thriller, CCI wonders why Mastertronic had a conspicuous Michael Jackson lookalike wandering around at the press launch!

RAKING IN THE MOON

"More than the usual 'shoot and hit' flat screen game" — that is the boast of J&J Gilmour about their new "sophisticated" arcade style game, Moonraker.

The 64 title features a fly-into space scenario over an extensive lunar type landscape with 3D animation. Gilmour most recently hit the number 11 spot in the charts with Emmet Attack for the VIC 20, and the company says Moonraker is "bigger, bolder and better."

Contact: J&J Gilmour Ltd, Dept. 418, 4 Copse Close, Liss, Hampshire GU33 7EW.

64 PARANOIA

The modern spy adventure comes to the 64!

Valkyrie 17, distributed by Palace Software, is set in a European alpine resort and requires the player to investigate the disappearance of an associate who has been murdered by Valkrie 17. The game is the first release from the Ram Jam Corporation.

Called a "slightly paranoid" adventure, the package comes with cassette, diecast metal badge and MI5-style dossier to help the player to piece together vital clues. On the reverse of the cassette are a series of cryptic answerphone messages designed to help thwart the bunch of ex-Nazis in their bid for world domination.

"It veers away from the arcade style games and is certainly one to get the grey matter working," says Palace Software's Pete Stone. "We envisage Valkyrie 17 doing extremely well, particularly with the older computer user."

Contact: Palace Software, The Video Palace Ltd., 275 Pentonville Road, London N1 9NL. Tel: 01-278 0751

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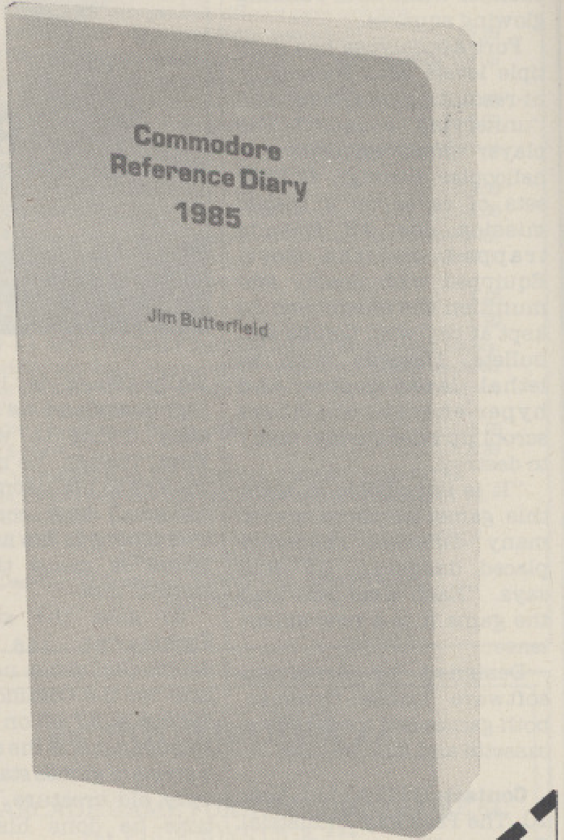

The Commodore 1985 Reference Diary — created by Jim Butterfield — is a must for anybody with a Commodore computer. The 1985 Reference Diary is packed with information and useful material relevant to everything from the whole range of Commodore Computers, their peripherals and all the tricks to get the best out of your machine. All of it in a clear easy to read style and with the authority that only Jim Butterfield — universally regarded as the world's leading expert on all aspects of Commodore — can provide. In addition, of course, the Diary has all the usual diary features and details. The 1985 Commodore Diary is unique in providing the comprehensive coverage of any information you might need throughout the year — an ideal companion for Commodore Computing International — the premier magazine in the field.

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More than a toy

Although strictly speaking George the Robot has no ties with Commodore computers, we are sure that anyone with the slightest interest in computers will love him. Sue Pearce puts George through his paces and discovers he is more than just a toy

Any child whould be delighted to find CGL's robot, George, under the Christmas tree this year. In fact most adults will probably have hours of fun with George as well!

Costing just £23.95, George stands at 16.8cm and is dressed fetchingly in grey, blue and red. Fully self-contained, an in-built microprocessor controller provides 48 programmable steps, three selectable gears and nine time intervals.

Traction and steering are provided by dual motors which drive rubber-tyred wheels and a built-in speaker and light are operated under control of the microcomputer.

As you can see, in addition to being a robotic playmate, George provides all the fundamental features of an expensive teaching system.

George comes complete with his own personal file – actually an 18-page, comprehensive manual including George's own message to you and some simple programming examples.

You don't need any programming skills to get you started – just one 9V and four 1.5V batteries. After correctly inserting the batteries (George sounds his siren continuously if you put them in the wrong way), switch to George's demo mode and let him show off. A word of advice here – make sure you set George in the centre of a fairly large space, at least six foot square.

George demonstrates his skills in moving left, right, backwards, forwards and curving to the left and right – at three different speeds. He also treats you to a display of his lights and sound capabilities.

In order to get to grips with George, it is wise to follow the manual's advice and try out the simple programs illustrated. George responds with a noise when he executes a program and a different noise on completion. Don't forget to press the 'clear last command' key before keying in a new program.

It's really very simple to learn how to program George and even the youngest user (CGL recommend George for age 5-years and upwards) will soon pick up the fundamentals of programming. My only gripe here is that the keys situated on top of George's head are tiny – perhaps designed to stop dad from keeping George all to himself!

Up to 48 commands can be stored. If you exceed this limit, George will emit a warning sound. Each command can be programmed to last up to 81 seconds by using the multiply command. for example, if you want George to move forward for 20 seconds you have a number of options. The longest method is to press the forward button followed by '5' (to indicate number of seconds), and repeat these moves four times. Obviously, it is a lot simpler to enter forward '5' x '4', just like multiplying with a calculator.

Another feature of George is the 'recollect running' function which makes George not only execute the program stored in memory, but make an about turn and execute the program again in a reverse manner.

I found that George worked best on a smooth surface such as flooring tiles or very smooth carpets, but definately not long pile carpets or bumpy surfaces. The computer jargon 'user-friendly' certainly fits the bill with George. In addition to making a noise indicate that the batteries have been put in the wrong way, George emits a warning noise every 2 minutes and 20 seconds in case you forget to turn his power off.

In conclusion, for £23.95 you really can't go wrong with George. Many electronic toys cost a lot more and very few have the same eductional value as George.

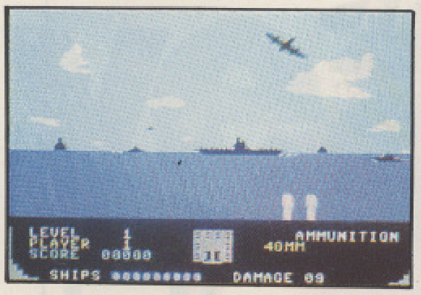
One final word of advice. If you do choose to buy George as a Christmas present for your children, make sure you remove the batteries before going to bed – George can make enough noise to wake the whole household!

Contact: CGL, CGL House, Goldings Hill, Loughton, Essex.

Bestsellers of '84

CCI presents the best 1984 had to offer you in arcade and adventure games for the Commodore 64 and VIC 20 based on sales by some of the top distributors.

BEST ARCADE FOR THE 64



Beach Head

Since its release in July, Beach Head was sold about 100,000 copies, says software house US Gold, who marketed the graphics extravaganza for the publishers, Access.

As admiral of a fleet of ships in Beach Head, the player must decide strategy, timing and all elements of an attack. If you are the naval gunman, you must contend with enemy fighters as you close in on their ships. Finally on the beach, you are tank commander fighting your way through the enemy-held beach and capture the island fortress.

US Gold is banking on a similar smash hit with the sequel to Beach Head, Raid over Moscow, which already has soared into first place in the Commodore software charts during its first month on the scene.

Contact: US Gold Ltd, Unit 24, Tipton Trading Estate, Bloomfield Road, Tipton, West Midlands DY4 9AH. Tel: 021-359 302

BEST ARCADE FOR THE VIC 20

Flight Path 737

Flight Path 737
ADVANCED PILOT TRAINER

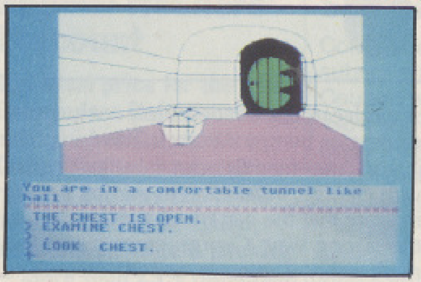
Anirog first launched Flight Path 737 for the VIC 20 in June and by September it had topped the 20,000 mark in sales, the company says.

Promoted as an "advanced pilot trainer," the VIC 20 version has since been combined onto the other side of the 64 version. An instrument panel including altitude, airspeed, aircraft heading and flap indicators is just one of the features that's sent this game to the top of the sales list.

The player, pilot of a high performance jet airliner, must take off from an airfield surrounded by high mountains and take the plane safely through crosswinds and other obstructions to a landing strip in the valley on the other side. Precision, skill and quick-thinking are just a few of the traits you need to make it through this one.

Contact: Anirog Software Ltd, 29 West Hill, Dartford, Kent DA1 2EL. Tel: 0322 92513

BEST ADVENTURE FOR THE 64



```
You are in a comfortable tunnel like
hall
THE CHEST IS OPEN.
> EXAMINE CHEST.
>
> LOOK  CHEST.
```

The Hobbit

Bilbo Baggins first made a hit in the book by JRR Tolkein, then on the big screen and this year on the little screen with the help of thousands of computers.

Though Melbourne House's company policy is not to quote sales figures, the company and distributors are happy with the success. In the adventure, Bilbo and his friends must seek out the evil Dragon and capture his hoard of treasure.

One of The Hobbit's attractions is the built-in language called 'inglish' that Melbourne House says is the "most sophisticated natural language recognition program yet developed on any microcomputer." The language recognises most configurations of a few words.

Contact: Melbourne House Publishers Ltd, Castle Yard House, Castle yard, Richmond, Surrey TW10 6TF. Tel: 01-940 6064

BEST ADVENTURE FOR THE VIC 20

The Wizard & The Princess

The wizard and the princess combined for a multi-part adventure that apparently caught the minds of enough VIC owners to make Melbourne House "very happy".

In this five-part game, a fair princess in the clutches of an evil wizard needs rescuing and you've got the job. You use the keyboard to control the knight as he slays dragons and monsters and ploughs through the labyrinth. The final test is a battle with a troll on a bridge while you're holding the princess.

Released about two years ago, The Wizard and The Princess continues to amaze its publishers, though once again Melbourne House won't quote sales figures.

Contact: Melbourne House Publishers Ltd, Castle Yard House, Castle Yard, Richmond, Surrey TW10 6TF. Tel: 01-940 6064

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Programmers of the year

CCI takes pleasure in voting Richard and David Darling our Programmers of the Year – a year in which the teenage brothers have gained a firm footing in the software industry with a non-stop supply of original games and programs such as the acclaimed Games Creator

Success has rocketed since CCI featured the Darling brothers in the Cult of the Programmer series back in April. Richard and David (then 16 and 17 respectively) had already established a place in the software market with their own company, Galactic, formed after overwhelming response to a classified advert placed in the computer press.

Orders began coming in for the brothers to write games for other companies. Eight titles were written for Ace and over half of the first 30 titles released by Mastertronic were provided by the Darlings. In August, Galactic joined forces with Mastertronic to form AI products, a company supplying products to a number of sources, although mainly Mastertronic.

A remarkably successful year for two young brothers with at least thirty games to their credit in addition to programs such as the highly acclaimed Games Creator written for Mirrorsoft. How, then, has 1984 effected the lives of Richard and David?

"I didn't really imagine all this happening," says 16-year-old Richard. "I would have been content just to continue with Galactic, but obviously we have far more opportunities with AI Products. Not only is more hardware available to us, but we have also got a lot more contacts, both companies and programmers, through Mastertronic."

Older brother David, 18 is very happy with the way things have gone in 1984. He says "This is what I wanted to happen. Giving up our own company wasn't bad because we gained more from becoming part of a big organisation."

There aren't many eighteen-year-olds who can claim to be a director of a successful company – Richard's directorship is being held by his mother until he comes of age.

How does David cope with the pressures of being a director? "We are used to the business side through Galactic," explains David. "I take more interest in the business of AI Products than Richard – and I have to wear a suit!

"I try not to get too involved otherwise it interferes with my programming, but I do attend the monthly board meetings and weekly meetings."

Still just 16, I wondered how Richard had fitted so much in since leaving school. "Officially I left school on 1 April, but I stopped going after Christmas 1983," Richard confesses.

Richard would appear, then, to be living proof that academic qualifications are not the be all and end all to a successful career. "I did go back to take O Levels," says Richard. "Although only the ones I thought I would pass."

Despite doing no school work between leaving school and sitting his exams, Richard still gained O Levels in Physics, Computer Science (surprise, surprise!) and Biology. He had sat English and Maths before leaving school.

"I've no regrets about leaving school so early," comments Richard. "I still see friends that stayed on at school who could also have been good programmers."

Have the brothers encountered any resentment from friends due to their success and related financial situation?

Richard says: "People where we come from, in Somerset, don't have much money and when we go back they are surprised at the way we spend money, although we don't throw it around."

"We don't boast about money," adds David. "In Somerset people won't buy beer in a pub if it's 2p more expensive than the pub down the road. It's nice to be able to go back and buy them all a drink."

Most weekends are spent with the family in Somerset. During the week the brothers live in a London flat above the AI offices – perk thrown in with the job. Very nice, but as Richard says, living on the premises can have its drawbacks.

"Throughout the day we get a lot of calls to go downstairs and sort out problems which could probably be solved without us if we were not so available." Richard continues "It may only take a few minutes, but it destroys your train of thought if you are in the middle of a program."

The other drawback is not having a cooked meal waiting for them at the end of the day. They do have the facilities of a microwave oven, but a quick trip to MacDonalds is usally favoured. Surprising maybe, when the brothers could surely afford to dine out in style.

Richard Darling

"The problem with eating out in restaurants", says David. "Is that it takes up the whole evening". Neither brother is forthcoming about the amount of money they are earning. "We are not paid for each individual program we write", says Richard. "We own part of AI Products, so theoretically we own a percentage of the profit. It makes sense to invest money back into the company".

The only luxury that David has indulged in is to buy himself a car, and Richard intends to follow suit as soon as he is old enough to drive.

So, 1984 has been a highly succesful year for the Darling brothers. What, do they think, does 1985 hold in store for them?

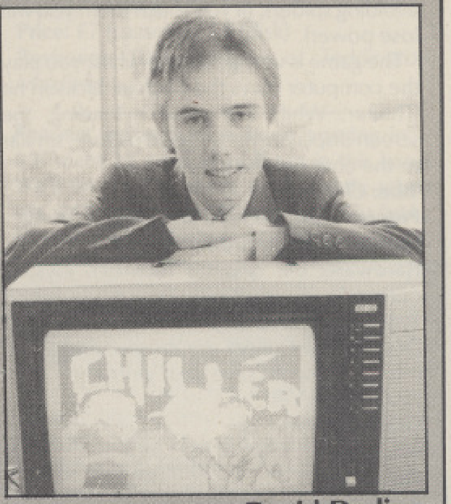
"We are developing artificial intelligence routines to put into adventure games and business programs", says Daivd. "For example, take an educational program which teaches children how to count. If the computer requests the answer to a simple question like 3+3=? and the child continually gives the correct answers, the computer will move on to more advanced questions. Alternatively, if the child is obviously having problems, the computer will stick at that level until the child improves".

This led us on to the question of speech synthesis and speech recognition and how soon they will be built into home computers.

"There already exists speech recognition and synthesis", says David. "It is a matter of production costs. I think 'intelligent' computers will be available in two years time rather than twenty".

What does David feel about the suggestion that speech recognition is being researched mainly because top (male) executives object to sitting at a keyboard?

He replies "It really doesn't matter why it is happening. The important thing is that when you want to communicate with another person, you don't do it by typing on their back!"



David Darling

BEEEEOW
BUDDA
BUDDA
VP VP VP TZING
WE CAN'T OUTRUN 'EM! AN' THERE'S TOO MANY OF 'EM!
WE'RE TRAPPED!

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EMPIRE

THWART THE PLANS OF THE EVIL EMPIRE AS IT ATTEMPTS TO CONQUER THE WORLD.

"This is a terrific game ... visually attractive and highly addictive." Home Computing Weekly

"An extremely good game ... highly recommended." Personal Computer News

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Readers

Now is your chance to disa
games reviewers! Here reade
their favourite

CHILLER

(Editor's note: See related story in our games news pages.)

"Oh no!" you are saying – not another rubbish £1.99 game. Well it is a £1.99 game, but it is far from rubbish.

The idea of the game is basically that your girlfriend has been chased by evil spirits and has hidden in a house of the undead. On the way to save her your car breaks down and the only way to save her is to collect a certain amount of magic crosses on the way, before you get onto the second level. During the first level of the game you are in a forest and have to get the crosses while avoiding spiders, (if you touch them you will lose power).

The game is very good and whilst you play the computer plays the Michael Jackson hit 'Thriller'. While the game is loading, the screen displays a pretty good picture, similar to the cover of the game.

Title: Chiller
Programmers: Richard and David Darling
Company: Mastertronic
Hardware: 64, cassette recorder, joystick optional
Type of game: Arcade
Description: Collect the crosses and avoid the evil spirits to save your girlfriend
Fast loader: Yes
Graphics: ****
Sound: ****
Playability: ****
Reader's Rating: ****
Price: £1.99 cassette
Reviewer: Martin Younger of Stockport, Cheshire

CHINA MINER

In this Ian Gray extravaganza you have to guide Miner Wallie (sound familiar?) through 30 different exciting screens.

You have to avoid various creatures while jumping onto platforms which might contain a crumbling floor or an awkward conveyor belt. You reach the key for the next level by collecting candles and pieces of jade which curiously look like odd shaped apples. There is a vast array of creatures which have been copied from other familiar games. The game, with lasers and all, is very addictive as you become intrigued to see what the next screen will be. However, each screen will take some time to master.

The graphics are colourful and quite good.

Apart from the 15 minutes loading time, the game is difficult but enjoyable and so is highly recommended for the patient.

Title: China Miner
Programmer: Ian Gray
Company: Interceptor Micros, Linden House, The Green, Tadley, Hants. Tel: 07356 71145
Hardware: 64, cassette recorder or disk drive, joystick
Type of game: Arcade
Description:. Guide Miner Wallie safely through 30 screens
Fast loader: None
Graphics: ***
Sound: **
Playability: ***
Reader's rating: ****
Price: £7 (cassette), £9 (disk)
Reviewer: N. Edwards of Bexleyheath, Kent

AZTEC CHALLENGE

Have you ever felt like running through scores of spear throwing natives, climbing crumbling pyramids, swimming Piranha infested rivers, and jumping snakes and spiders – as well as running over collapsing rope bridges? Well now's your chance with this amazing program from Paul Norman.

To begin with, the Cosmi sign dissolves wonderfully into the Aztec symbol. This is followed by the computers request for you to input the level of difficulty you require. Then you begin your first task, running past lines of rather angry natives, ducking and jumping the onslaught of spears.

I managed to near the end of the task by the twentieth go, only to fail by the sudden impulse to get up and dance to the wonderful music. Overall, it has lasting appeal and that one-more-go syndrome.

Title: Aztec Challenge
Programmer: Paul Norman
Company: Audiogenic, PO Box 88, Reading, Berks. Tel: 0734 586334
Hardware: 64, disk drive or cassette recorder, joystick
Type of game: Arcade
Description: Escape from your doom as a ritual sacrifice to the gods
Fast loader: Yes
Graphics: ****
Sound: *****
Playability: *****
Reader's Rating: *****
Price: £8.95 (cassette), £12.95 (disk)
Reviewer: Carl P. Coffey of Longfield, Kent

SNOWBALL

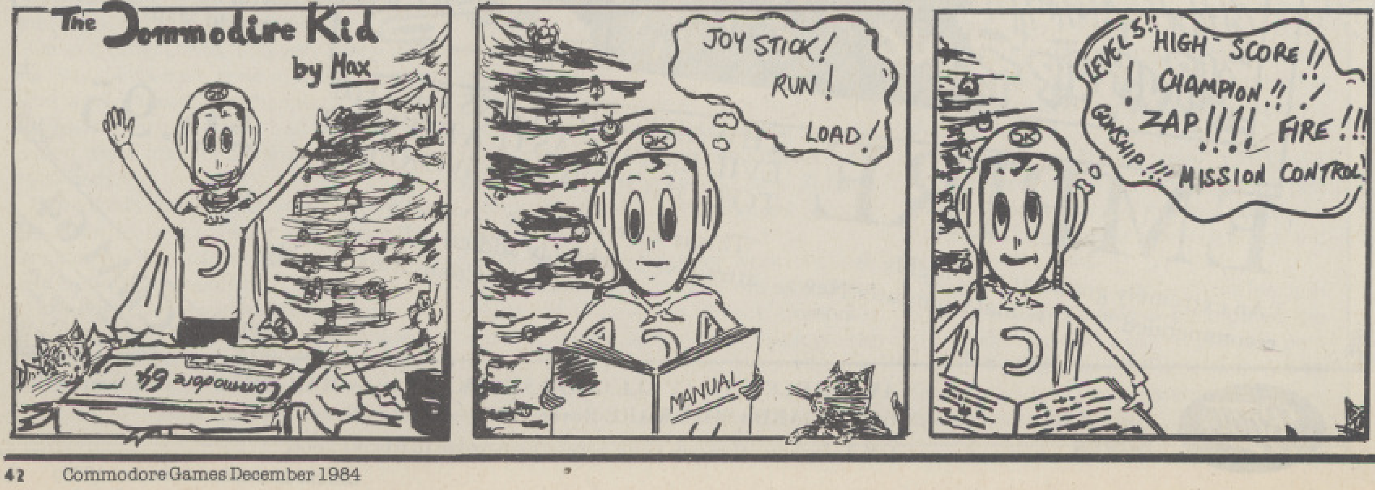
The five mile long colony starship, Snowball 9 has been hijacked and sabotaged – its robots modified. Can you, as Kim Kimberley (shades of the Lensmen), secret agent extraordinary, save the 1,800,000 colonists?

At the start of the game you have been prematurely wakened from suspended animation. Something is wrong, but what? You're first task is to avoid the Killer Nightingales and leave the mortuary levels. Easier said than done. Later in the game you will encounter cleaning droids, an impassable worldroid and a cute pussy cat.

Snowball is a pure text adventure with over 7,000 locations, impossible to map but challenging to play. It suffers nothing from having no graphics since the text descriptions are extremely detailed – so much so that the adventure reads like a good novel. If you think a picture is worth a thousand words, play this game and think again.

Level 9 say Snowball should take about two weeks to complete. I found this two weeks well spent and recommend this adventure 100%.

Title: Snowball
Programmer: Pete Austin
Company: Level 9
Hardware: 64, cassette recorder
Type of game: Text adventure
Description: Save the snowball from destruction
Fast loader: None
Graphics: None
Sound: None
Playability: *****
Reader's Rating: *****
Price: £9.90 cassette
Reviewer: Paul Serbert of Harrogate, N. Yorkshire


The Commodire Kid
by Max
Commodore 64
JOY STICK! RUN! LOAD!
MANUAL
LEVELS!! HIGH SCORE!! CHAMPION!! ZAP!!!! FIRE!!! GUNSHIP!!! MISSION CONTROL!

s' Choice

disagree (or agree) with the CCI
readers write their own reviews of
urite games of 1984

TALES OF THE ARABIAN NIGHTS

This is a difficult game to play, but very challenging, with excellent graphics, sound and even speech. The music and/or speech may be switched off. There is also a pause game facility.

As an Arabian Prince you must rescue the Princess from the evil Sultan.

Screen one has you on board a very realistic ship where you climb high and low to collect jugs engraved with letters, which spell out the word Arabian. Jugs have to be collected in sequence, and it is dangerous to jump from high places. To make things more difficult you must avoid cannonballs, giant birds and octoppi.

This jug collecting continues throughout the game, each screen more difficult. Five lives are given – and usually lost on screen three!

Several of the eight screens have no jugs, and you have a chance to shoot back at crocodiles or Arabian guards.

If the Princess is rescued game starts all over again.

Title: Tales of The Arabian Nights
Programmer: Ian Gray
Company: Interceptor Software
Hardware: 64, cassette recorder or disk drive, joystick
Type of game: Arcade
Description: Climbing, jumping and shooting skill needed
Fast loader: Ultra load
Graphics: *****
Sound: *****
Playability: ****
Reader's Rating: *****
Price: £6.80
Reviewer: E.E. O'Brien of Mavley, Cheshire

TROLLIE WALLIE

Quite a recent arcade game from Interceptor Micros, Trollie Wallie is not a stranger in computer games, as we have seen him in a few other Interceptor games.

The game takes place in a supermarket where you must guide Wallie past obstacles including going under bars which are moving up and down all the time, past the patches of dreaded lethal grass and avoiding all the monsters, which makes poor Wallie terribly confused.

If he finds his only path blocked by a wall, he must find the switch that makes the barrier fall. Avoiding these hazards, Wallie must collect all the supermarket items. He can only carry five items at a time, so when he has five items he must travel along the screen, up ladders, along moving conveyor belts (which are not always moving in the same direction as him) and down slopes until he finds the cash desk. There he pays for the five items and sets off to collect another five until he has collected all forty items.

Title: Trollie Wallie
Programmer: Andrew Challis
Company: Interceptor Micros, Linden House, The Green, Tadley, Hants. Tel: 07356 71145
Hardware: 64, cassette recorder or disk drive, joystick
Type of game: Arcade
Description: Guide Wallie round the supermarket collecting items and avoiding many obstacles
Fast loader: Ultraload
Graphics: *****
Sound: ****
Playability: *****
Reader's rating: *****
Price: £7 (cassette), £9 (disk)
Reviewer: Luci Kershaw of Teddington, Middlesex

Readers' reviews have been pouring in – too many to print all of them in this issue! We'll be printing more next month, when we announce the names of the lucky winners who will join our CCI Review Panel.

THE HOBBIT

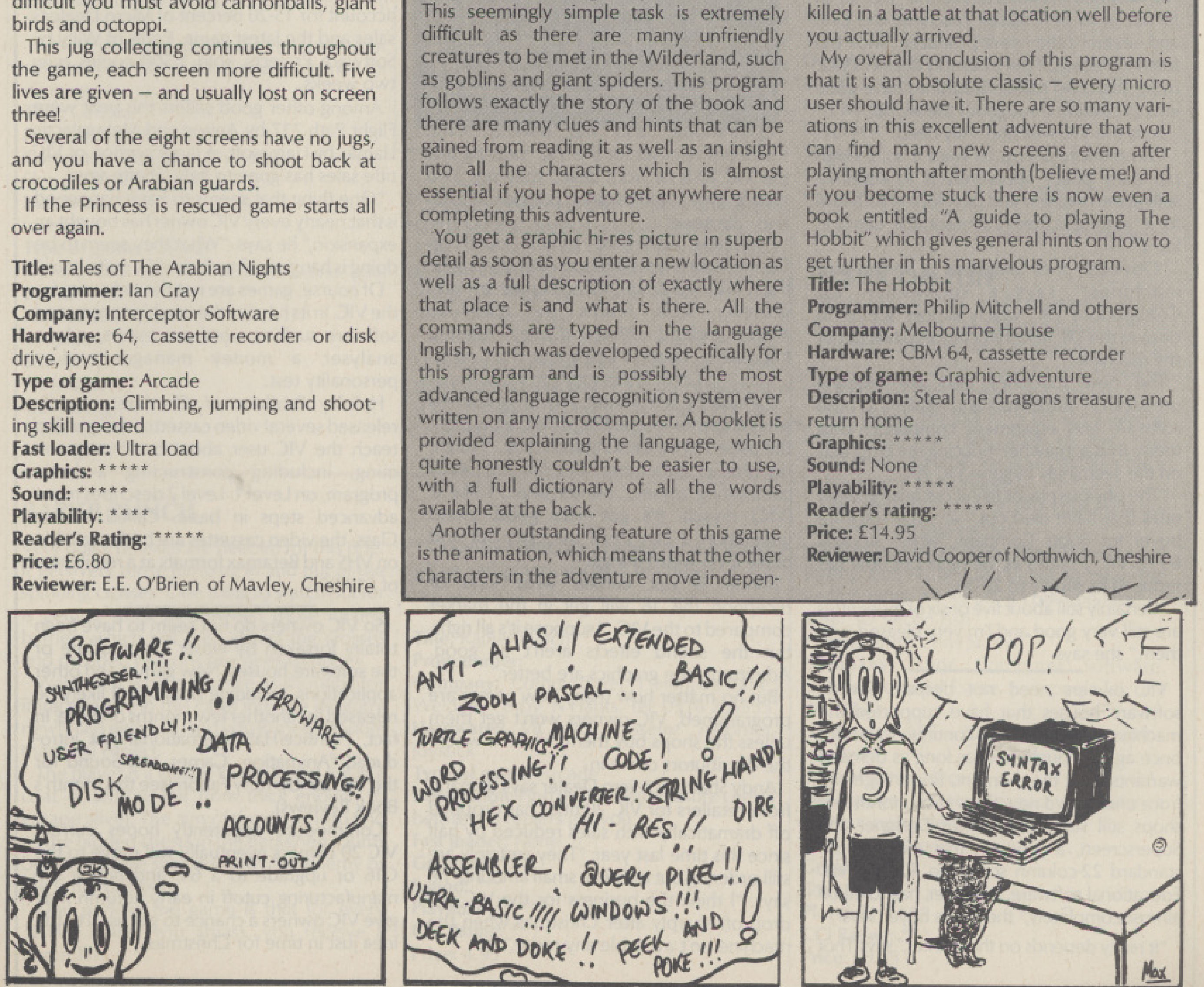
This adventure program places you in the shoes of the central character Bilbo Baggins with the task of stealing gold from an evil dragon and returning it to your hobbit hole. This seemingly simple task is extremely difficult as there are many unfriendly creatures to be met in the Wilderland, such as goblins and giant spiders. This program follows exactly the story of the book and there are many clues and hints that can be gained from reading it as well as an insight into all the characters which is almost essential if you hope to get anywhere near completing this adventure.

You get a graphic hi-res picture in superb detail as soon as you enter a new location as well as a full description of exactly where that place is and what is there. All the commands are typed in the language Inglish, which was developed specifically for this program and is possibly the most advanced language recognition system ever written on any microcomputer. A booklet is provided explaining the language, which quite honestly couldn't be easier to use, with a full dictionary of all the words available at the back.

Another outstanding feature of this game is the animation, which means that the other characters in the adventure move independently of you, so that you sometimes come across the remains of events in which you did not take part. For example, it is not uncommon to come across a dead body killed in a battle at that location well before you actually arrived.

My overall conclusion of this program is that it is an obsolute classic – every micro user should have it. There are so many variations in this excellent adventure that you can find many new screens even after playing month after month (believe me!) and if you become stuck there is now even a book entitled "A guide to playing The Hobbit" which gives general hints on how to get further in this marvelous program.

Title: The Hobbit
Programmer: Philip Mitchell and others
Company: Melbourne House
Hardware: CBM 64, cassette recorder
Type of game: Graphic adventure
Description: Steal the dragons treasure and return home
Graphics: *****
Sound: None
Playability: *****
Reader's rating: *****
Price: £14.95
Reviewer: David Cooper of Northwich, Cheshire


SOFTWARE!!
SYNTHESISER!!!!
PROGRAMMING!!
HARDWARE!!
USER FRIENDLY!!!
DATA
SPREADSHEET!!
DISK MODE!!
PROCESSING!!
ACCOUNTS!!
PRINT-OUT
ANTI-ALIAS!! EXTENDED BASIC!!
ZOOM PASCAL!!
TURTLE GRAPHICS
MACHINE CODE!
WORD PROCESSING!!
HEX CONVERTER!
STRING HAND
HI-RES!!
DIRE
ASSEMBLER!
QUERY PIXEL!!
ULTRA-BASIC!!!!
WINDOWS!!!
DEEK AND DOKE!!
PEEK AND POKE!!!
POP!
SYNTAX ERROR
MAX

Is VIC dead ?

Viola Çienger discovers that there's life in the old VIC yet!

VIC 20 owners unite!

It's not likely to happen quite as a revolution, but distributors, retailers and games programmers are finding a unique dedication among VIC 20 owners to their machines, despite the recent decision by Commodore to halt production.

"VIC owners are quite a loyal breed," says Mike Anderiesz of Romik Software, one of the companies that have supported the VIC with software products. "They're very reluctant to put their VIC in the bin."

That tight grip on your VIC may have to be loosened in the future, however. Commodore UK announced this autumn it has stopped manufacturing the VIC 20 in favour of its new starter machine, the C16, and several other new products. Since the first VIC rolled off the assembly lines in 1982, more than two million machines have gone into circulation throughout the world.

So is the VIC well and truly dead?

Commodore seems to want it so, though company policy apparently is to continue selling the machine and developing software for it "as long as there's a reasonable demand for it."

"Obviously their emphasis is on the new machines," says a spokesman for Commodore UK, which almost seems to disown the VIC in its reluctance to talk about the machine.

The new machines also are exerting pressure on distributors and retailers to push software and equipment compatible with them, thus somewhat reducing the emphasis on the seemingly bygone VIC 20.

"The obvious places to cut out are the older titles that have died out," says the software buyer for Boots Company, which stocked 60-70 VIC 20 titles at the peak but now has reduced its supply to 20-30.

"Certainly still about five or six of those titles are still very good and I'm very pleased with them," she says.

VIC owners need not despair. Several software houses that have supported the machine in the past will continue to do so, once again though, only as long as demand warrants it. At the moment, Boots is getting from one to two new titles each month and shops still stock the Games Designer and Superscreen, a program that expands the standard 22-column screen to 40 columns. Educational software, however, has "died off almost completely," the Boots buyer says.

"It really depends on the market," says Thor Computer Software's Paul McKenna. The Liverpool based company has three games out for the VIC, the most recent of which is the £6.95 arcade game Olly. "We won't be dropping it completely.

"Once a computer is taken off the market by the company, it's been found that the software seems to drop off, too. I don't know why that is – perhaps the distributors just aren't taking it anymore or the public just stop buying it," he says. "I would have thought there would still be a market."

Visions Ltd, who brought out Snooker, released Maze Gold about six weeks ago to what they found a surprisingly enthusiastic audience. "We're quite happy with that one," says spokesman Mike Carroll. "There does still seem to be a market for the VIC 20."

He says Visions is planning several more releases for the VIC in the near future.

Commodore also has offered some Christmas releases for the VIC "proving that the VIC 20 is far from dead," they say. Two arcade type games are Bomber Mission and Starbase.

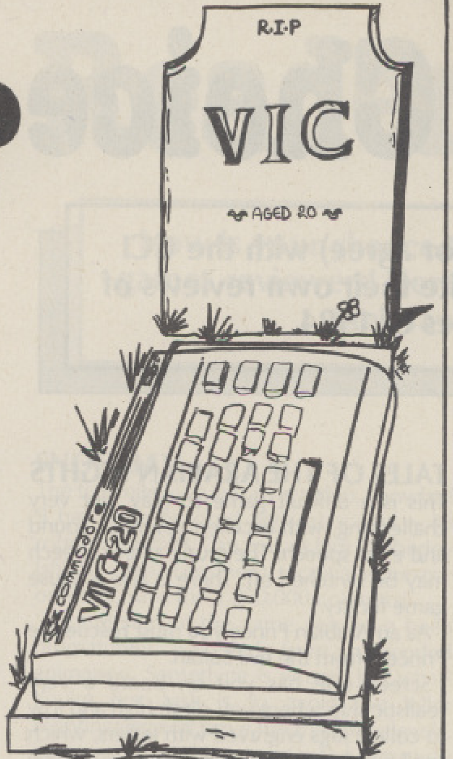
Five new adventure games round up Commodore's generous software offering for the Christmas trade. All designed by programmer Scott Adams, the titles are Adventureland, Pirate Cove, Mission Impossible, Voodoo Castle and The Count.

Llamasoft's Jeff Minter has programmed several games for the VIC 20 in the past, but the pace will be slacking with time. "I might do one or two more, but I'm not really committing myself," Minter says. "I like it (VIC) myself. It's got very good sound generation. I can freak the chip out and make it do weird things."

Minter is not certain what kind of reception the 16 will get in the market compared to the VIC. "I suppose it's all right, but the sound effects aren't as good. Admittedly the graphics are better."

But no matter how many new games are programmed, VIC owners won't get them unless the shops buy them, which is where the distributors come in.

Andy Shafte of Micro Dealer says demand from retailers for VIC 20 titles has dropped off dramatically with sales reduced by half since this time last year. "They certainly are still ordering but only in a small amount," he says. "I think the business for the VIC will drop off sharply after Christmas when the machine isn't available any more."



Nevertheless, VIC titles continue to account for 15-20 percent of Micro Dealer's sales and the latest game, Perils of Willy by Software Projects, sold 1,500 copies over two weeks.

Among other good sellers this year were Flight Path 737 by Anirog and Metagalactic Llamas by Llamasoft. A large portion of VIC title sales has gone to Italy, Shafte says.

"One thing that seems to have happened is that nearly every VIC owner has bought an expansion," he says. "What they seem to be doing is hanging on to their VICs quite hard."

Of course, games are not the only uses for the VIC. In its heyday the machine prompted software such as word processors, a loan analyser, a money manager and a personality test.

Holiday Brothers of Cheshire recently released several video cassettes designed to teach the VIC user about basic programming, including constructing a basic program, on Level 1. Level 2 describes more advanced steps in basic. Called Master Class, the video cassettes are both available on VHS and Betamax formats at a retail price of £19.95.

So VIC owners do not seem to have been totally forsaken by either Commodore or the software houses. New games and other applications, including books, will likely be released for another few months or more. In fact, Prentice/Hall International just introduced "Animation, Games and Sound for the VIC 20" by Tony Fabbri (see this month's Book Reviews).

Commodore apparently hopes current VIC 20 owners eventually will move to the C16 or upgrade to a 64, and timing the manufacturing cutoff in early autumn may give VIC owners a chance to get used to the idea just in time for Christmas.

Value for VIC

A selection of VIC games are reviewed by two of our younger CCI reviewers – Teresa Geneva (14) and Andrew Harris (16)

GALAXIA

This speedy game starts off by telling you that you are a 'human scum'!! and that they rule your galaxy and you have no future. They don't show any mercy, but at the beginning of the game they actually wish you good luck!

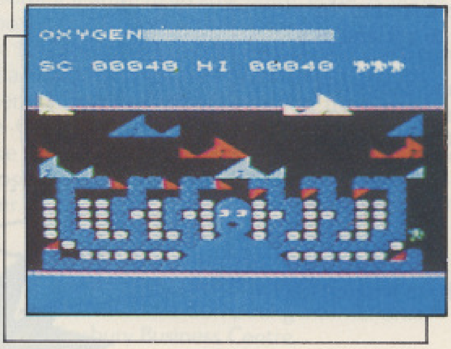
Next thing you know, you've got to dodge aliens, enouremetor storms and laser fire. By the press of your firing button you can terminate them. Don't worry if the aliens look suspiciously like spiders, because they are not.

Once you get onto the enouremetor storms, you don't have much chance of winning.

Title: Galaxia
Programmer: Mark Conway
Company: Romik, 272 Argyll Avenue, Slough, Berks. Tel: 0753 71535
Hardware: VIC 20, cassette recorder, joystick
Type of game: Arcade
Description: Destroy obstacles and gain points
Fast loader: None
Graphics: ***
Sound: ***
Playability: ***
CCI Rating: ***
Price: £5.99

OLLY

You, Peter the Pearl Diver, have to be fast moving but patient to take part in this escapade.



Concentration is the key to getting past the continuously moving sharks. There are six levels: the top level being 'the impossible', the lowest being very slow. (The higher the level, the faster the sharks move and the faster the music.)

Beware of the sharks, for a bite or sting could cost you points. Once you have passed the sharks, you tackle the obstacle of the poisonous tipped tenacles of Olly Van Octopus, to get to the pearls.

But watch it, time is short. You only have a certain amount of oxygen to stay under the water, so once you have gathered all the pearls, hurry up to regain your breath. You then qualify to go onto another game with jellyfish, which isn't as easy as it sounds.

Title: Olly
Programmer: Fred J Gray
Company: Thor Computer Software, Erskine Industrial Estate, Liverpool. Tel: 051 263 8521
Hardware: VIC 20, cassette recorder, joystick
Type of Game: Arcade
Description: Get past the sharks and gather pearls before time runs out
Fast loader: None
Graphics: ***
Sound: **
CCI Rating: ***
Price: £6.95

RAPIER PUNCH

Very quick reflexes are needed for this one. It gets very tense jumping in and out of the spinning crosses. One thing to watch out for is getting stuck in between those lurking barriers which will then attract the crosses and dreaded dragons like bees to honey.

Watch out where you fire as shooting (or firing daggers in this case) into the dragon's newly laid eggs can land you in more trouble than you expect.

The player is a gallant knight kitted out in a coat of armour (far from thick enough to escape alive). The aim of the game is to find all the hidden chests in the darkened rooms before you are shot down by the enemy or the time runs out.

One perk in the game is that for every 10,000 points you amass, you receive a bonus life.

Graphics are about average for this sort of game and points are easy to come by.

Title: Rapier Punch
Programmer:
Company: Commodore, 1 Hunters Lane, Weldon, Corby, N Hants. Tel: 0536 205555
Hardware: VIC 20, cassette recorder, joystick
Type of game: Arcade
Description: Find the hidden treasure chests before the rapiers get you
Fast loader: None
Graphics: **
Sound: ***
Playability: ****
CCI Rating: ***
Price: 4.99

3D SILICON FISH

Watch out, there's a silicon about! These silicons let off a gas called Kryllon. This is constantly forming and exploding. You, as Sillo, have an order from Earth's Supreme Council to go and collect the silicons.

You travel around in your own 'silicon fisher' and you are able to fire one interceptor at a time, for your batteries have to have time to recharge.

You have five levels to test your skills on, each level getting harder.

The maze you go round has silicons spread throughout, so be careful not to be in the Kryllon when it's let off. It could be fatal!

Title: 3D Silicon Fish
Programmer: Chris Stamp
Company: Thor Computer Software, Erskine Industrial Estate, Liverpool. Tel: 051 263 8521
Hardware: VIC 20, cassette recorder, joystick
Type of game: Arcade
Description. Collect the reactive substance without being destroyed
Fast loader: None
Graphics: ***
Sound: ****
Playability: ***
CCI Rating: ***
Price: £5.95

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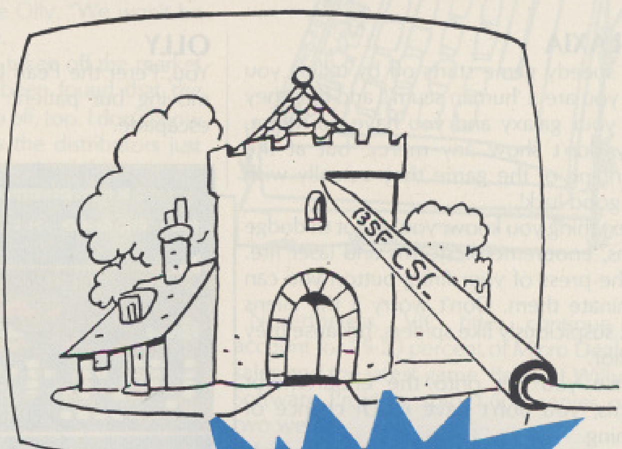

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Do you use tapes? Are you sick and tired of waiting for your programs to be Loaded/Saved from/on the tape? then you need a **TORNADO!!** Tornado allows you to Save/Load/Verify your Basic/machine code programs faster than a CBM 1541 disk drive does!! Due to popular demand! Tordado now comes with new and more powerful commands plus extra instructions to assist you in making fast versions of your existing machine code/Basic programs. Tornado is available on tape for CBM 64 and 8K+ Vic 20.

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ROM-FILE which contains a complete disassembly of CBM 64 and Vic 20 ROM with comments! As well as a complete description of all 6502/6510 instructions and addressing modes + a complete listing of a machine code monitor!

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£1000 of software FREE for the adventurous

If you know the vital elements of an adventure game, you could win Gilsoft's Gold Collection of adventures written with the Quill

Various elements combine to make a successful adventure game. Listed below are eight adventure ingredients. Your task is to list these in the correct order of priority – as decreed by the CCI Adventure Master. For example, if you think that graphics are the most important feature of an adventure, enter 'A' under box 1 in our priority box.

The first 10 correct entries received will each win a complete set of the eight adventures in Gilsoft's Gold Collection.

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The closing date for our Gold Collection competition is 20 December.

Send your entries to:
Gold Collection Competition,
Commodore Computing International,
Finsbury Business Centre,
40 Bowling Green Lane,
London EC1R ONE

ADVENTURE INGREDIENTS

A Use of graphics
B Originality
C Speed of response
D Variety of response
E Sufficient vocabulary
F Logical solutions to problems
G Atmosphere
H Save game feature

ORDER OF PRIORITY

1	2	3	4	5	6	7	8

My choice of game is: ______________________

Name: ______________________

Address: ______________________

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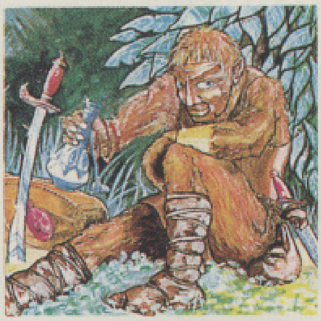
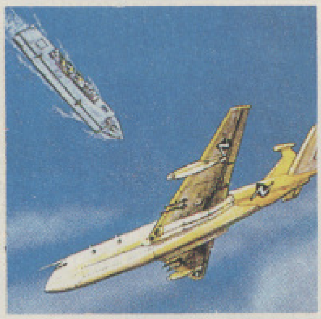
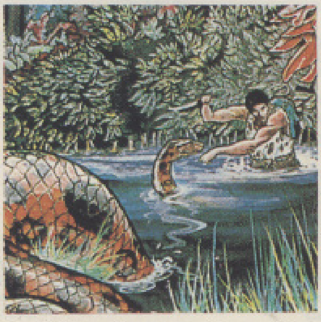


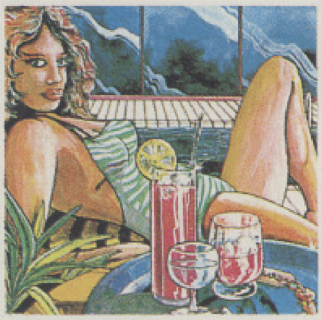
Borsak the Dwarf: set in the mythological world, you must help Borsak in his perilous task of recovering the treasures of his ancestors



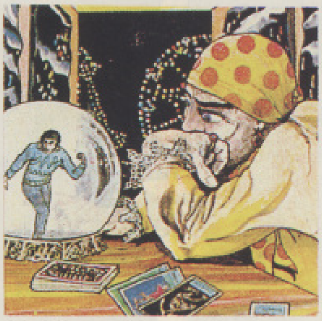
Spy Plane: can you survive high over enemy territory and collect the vital intelligence information?



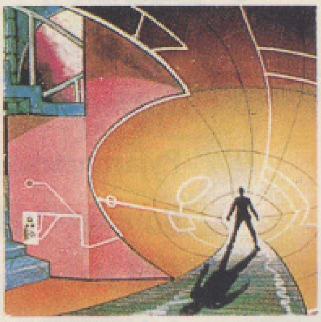
Devil's Island: escape from this infamous prison island is said to be impossible, but what alternative have you?



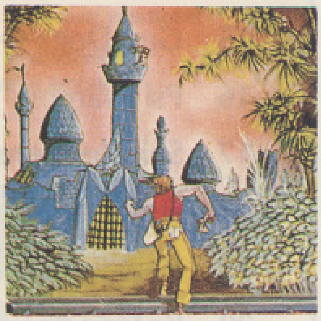
Africa Gardens: what is the secret of the deserted hotel and who is Mr Robinson?



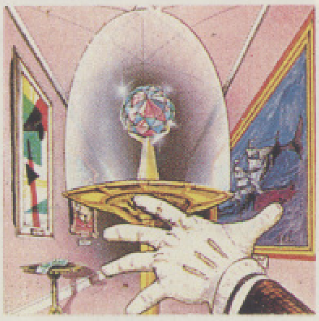
The Curse: "Some select the tarot cards or palms to tell fortune," said the fortune teller. "but you have been chosen by the crystal."



Mindbender: only you alone have the will to resist and thus save the world from the terrible power of the Mindbender



Magic Castle: only the sharpest witted adventurer will survive the lethal booby traps and perils to rescue the princess



Diamond Trail: where in this city of death and intrigue is the stolen Sinclive diamond?

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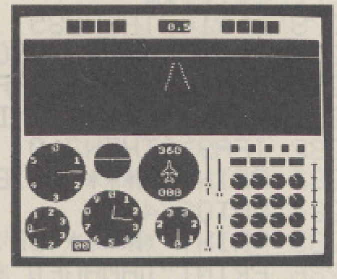

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Starship saga

Our intrepid Star Trek adventure continues this month. Don't miss next month's final installment of Richard Franklin's mega-adventure for the 64.

```
255 IFD(I)=0THEN259
256 D(I)=D(I)+W1/2
257 IFD(I)<0THEN259
258 D(I)=0
259 NEXT I
260 IFRND(1)>.25THEN310
261 R1=INT(RND(1)*7+1)
262 IFRND(1)>.5THEN296
263 IFC$<>"DOCKED"THEN270
264 PRINT"▒*** SPACE STORM, ";
265 PRINT"STARBASE ENVIRONMENTAL"
266 PRINT"PROTECTORS ACTIVATED. ALL HARMFUL"
267 PRINT"RADIATION AND ENERGY FACTORS ARE "
268 PRINT"ABSORBED."
269 GOTO310
270 IFZ$="UP"THEN278
271 D(R1)=D(R1)-(RND(1)*5+1)
272 PRINT"▒*** SPACE STORM ,"F$(R1)" DAMAGED."
273 IFF$(R1)<>"ENERGY SHLDS"THEN310
274 C5=0
275 PRINT"▒*** ENERGY SHIELDS ARE DOWN ***"
276 Z$="DOWN"
277 GOTO310
278 IFR1=7THEN285
279 PRINT"▒*** SPACE STORM ,ENERGY SHIELDS";
280 PRINT" WARD OFFDAMAGING EFFECTS"
281 A9=A9-(1044*RND(1)+50)
282 IFA9>0THEN310
283 PRINT"▒*** SHIELD ENERGY EXHAUSTED ***"
284 GOTO274
285 PRINT"▒**** SEVERE SPACE STORM ,"F$(7)
286 PRINT"DAMAGED ****"
287 PRINT"▒*** ENERGY SHIELDS ARE DOWN ***"
288 Z$="DOWN"
289 C5=0
290 A9=A9-1000
291 D(7)=D(7)-3*RND(1)
292 R1=INT(RND(1)*6+1)
293 D(R1)=D(R1)-3*RND(1)
294 PRINT"*** "F$(R1)" ALSO DAMAGED ***"
295 GOTO310
296 FOR I=R1 TO 7
297 IFD(I)<0THEN304
```

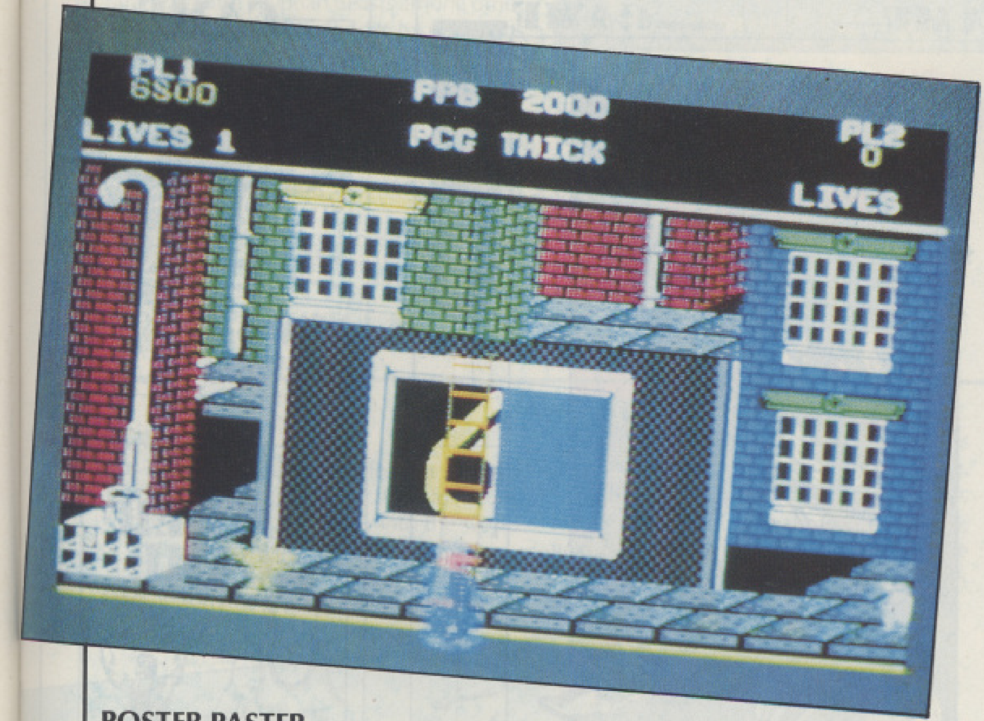
```
298 NEXT I
299 IFR1<2THEN303
300 FOR I=1 TO R1-1
301 IFD(I)<0THEN304
302 NEXT I
303 GOTO310
304 R1=I
305 D(I)=D(I)+RND(1)*5+1
306 IFD(I)<=0THEN308
307 D(I)=0
308 PRINT"▒*** TEMPORARY TRUCE, "F$(I)" STATE"
309 PRINT"OF REPAIR IMPROVED ***"
310 N=INT(W1*8)
311 T=T+(INT(W1*2.5+.5))/10
312 IFV<>1THEN314
313 T=T+(INT(W1*2.5+.5)/23)
314 E=E-2*N
315 Q(S1,S2)=0
316 X=S1
317 Y=S2
318 IFT>T0+T9THEN653
319 GOSUB537
320 IFN<1THEN329
321 FOR I=1 TO N
322 S1=S1+X1
323 S2=S2+X2
324 X3=INT(S1+.5)
325 Y3=INT(S2+.5)
326 IFS1<.5ORS2<.5ORS1>=10.5ORS2>=10.5THEN348
327 IFQ(X3,Y3)<>0THEN330
328 NEXT I
329 GOTO344
330 Z5=Q(X3,Y3)
331 IFZ5<>6THEN336
332 Z3=Q1
333 Z4=Q2
334 GOSUB1211
335 GOTO756
336 IFZ5<>2THEN338
337 GOTO756
338 PRINT
339 GOSUB1093
340 PRINTN$" BLOCKED BY OBJECT AT"
341 PRINT"SECTOR: "INT(S1+.5)"-"INT(S2+.5)"."
342 S1=S1-X1
343 S2=S2-X2
344 S1=INT(S1+.5)
345 S2=INT(S2+.5)
346 Q(S1,S2)=A5
347 GOTO210
348 Q1=INT(Q1+W1*X1+(X-.5)/10)
349 Q2=INT(Q2+W1*X2+(Y-.5)/10)
350 IFQ1<1THENQ1=1:Z2=1
```

(continued on page 27)

```
351 IFQ1>L8THENQ1=L8:Z2=1
352 IFQ2<1THENQ2=1:Z2=1
353 IFQ2>L8THENQ2=L8:Z2=1
354 IFZ2=1THENGOSUB1252
355 PRINT
356 IFQ1<>M1ORQ2<>M2THEN362
357 Q1=INT(L8*RND(1)+1)
358 Q2=INT(L8*RND(1)+1)
359 IFG(Q1,Q2)>99THEN357
360 PRINT"◘SUPERNOVA SHOCK WAVE PUTS YOU IN"
361 PRINT"QUADRANT"Q1"-"Q2"."
362 IFG(Q1,Q2)>999THEN1043
363 Z2=0
364 S1=INT(RND(1)*10+1)
365 S2=INT(RND(1)*10+1)
366 GOTO104
367 :
368 IFD(3)>=0THEN372
369 PRINT"◘LONG RANGE SENSORS ARE INOPERABLE"
370 PRINT
371 GOTO210
372 PRINT"⊐LONG RANGE SENSOR SCAN FOR QUADRANT"
373 PRINTTAB(18)Q1"-"Q2"."
374 PRINTTAB(10)"◘◘┌──────────────────────┐"
375 FOR I=Q1-1 TO Q1+1
376 PRINTTAB(10)"|                      |"
377 N$(1)="  -1":N$(2)="  -1":N$(3)="  -1"
378 FOR J=Q2-1 TO Q2+1
379 IFI<1THEN385
380 IFI>L8THEN385
381 IFJ<1THEN385
382 IFJ>L8THEN385
383 N$(J-Q2+2)=RIGHT$("    "+STR$(G(I,J)),4)
384 C0(I,J)=G(I,J)
385 NEXT J
386 PRINTTAB(10)"|:"N$(1)":"N$(2)":"N$(3)":|"
387 PRINTTAB(10)"|                      |"
388 PRINTTAB(10)"├──────────────────────┤"
389 NEXT I
390 PRINTTAB(10)"⌉└──────────────────────┘◘"
391 GOTO210
392 :
393 IFD(4)>=0THEN397
394 PRINT"◘PHASER CONTROL IS DISABLED"
395 PRINT
396 GOTO210
397 IFC5=0THEN401
398 PRINT"◘YOU MUST LOWER YOUR ENERGY SHIELDS ";
399 PRINT"TO   FIRE.◘"
400 GOTO214
401 H9=1
402 PRINT"◘DO YOU WANT A DOUBLE BURST ?";
403 INPUT#2,H1$:PRINT
```

A sticky situation

It's a stick up! Taskset's Poster Paster is reviewed along with a host of other new games.



All games reviews appearing in this magazine are personal opinions and serve only as a guide to new games on the market. Our star ratings for graphics, sound, playability and the CCI rating are as follows:

*** = Poor**
**** = Average**
***** = Good**
****** = Very good**
******* = Excellent**

POSTER PASTER

Practise makes perfect they say and it certainly takes a few games to get the hang of Poster Paster. You control Bill the poster paster who has a box of papers, a paste bucket and a ladder.

Bill has to be positioned carefully in order to retrieve the posters from the box. The joystick fire button is pressed when Bill's hand is over the poster. Bill must also negotiate the ladder – again requiring careful positioning.

Once you have the poster and ladder in position, your paste must be of the correct consistency before you can even attempt to go up the ladder and try to paste the poster. At the top of the screen is the paste consistency gauge (PCG). If left for too long the paste will solidify and you want to be able to flick paste at the Gnurds, Wazzocks and Drain Brains. Any contact with them is fatal and you lose a life, but if you successfully flick paste at them they are destroyed gaining you points.

If your paste does solidify, the Wazzocks must be let through to water down the paste, but if too many get through, the paste becomes too runny.

So finally, once everything is in position, you press the fire button to paste up part of the poster. If the poster isn't exactly in the right position it will fall off.

Very frustrating. Poster Paster needs a lot of practise, but is very addictive once you've got the knack.

Title: Poster Paster
Programmers: Andy Walker, Paul Hodgson, Andy Rixon, Mark Butlery.
Company: Taskset', 13 High Street, Bridlington. Tel: 0262 602668
Hardware: 64, cassette player, joystick
Type of game: Arcade
Description: Successfully paste up posters
Fast loader: Pavloda
Grahpics: ***
Sound: ***
Playability: ****
CCI Rating: ***
Price: £6.90

KILLER CRABS

Oh dear! With a great name like Killer Crabs, it's a shame that the game is not all it could be. It is a slow and boring version of space invaders. Instead of aliens you blast a shark, octopus and seahorse which are dropping fish bones on you. Really! Killer Crabs firing rockets – it's all a bit much.

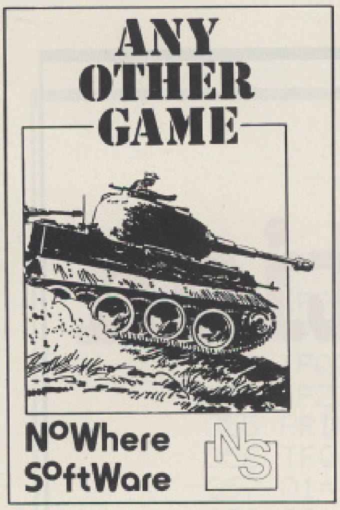
You are the crab sitting on the seabed with the creatures descending on you. If you hit one it is knocked back upwards. If you are lucky enough to actually hit them all back out of the water you start the bonus screen gaining extra points.

On the bonus screen you must sink the sailing boat by hitting it five times.

The graphics are quite realistic, especially the shark, but unfortunately the game is a miss.

Incidentally, a synthesiser program is tagged onto the end of the program.

Title: Killer Crabs
Programmer: G S Nock
Company: Noik Software, Hillcrest House, Cherhill, Calne, Wilts.
Hardware: 64, cassette recorder, joystick
Type of game: Arcade
Description: Score points by knocking enemies out of the water
Fast loader: no
Graphics: **
Sound: *
Playability: **
CCI rating: **
Price: £6.50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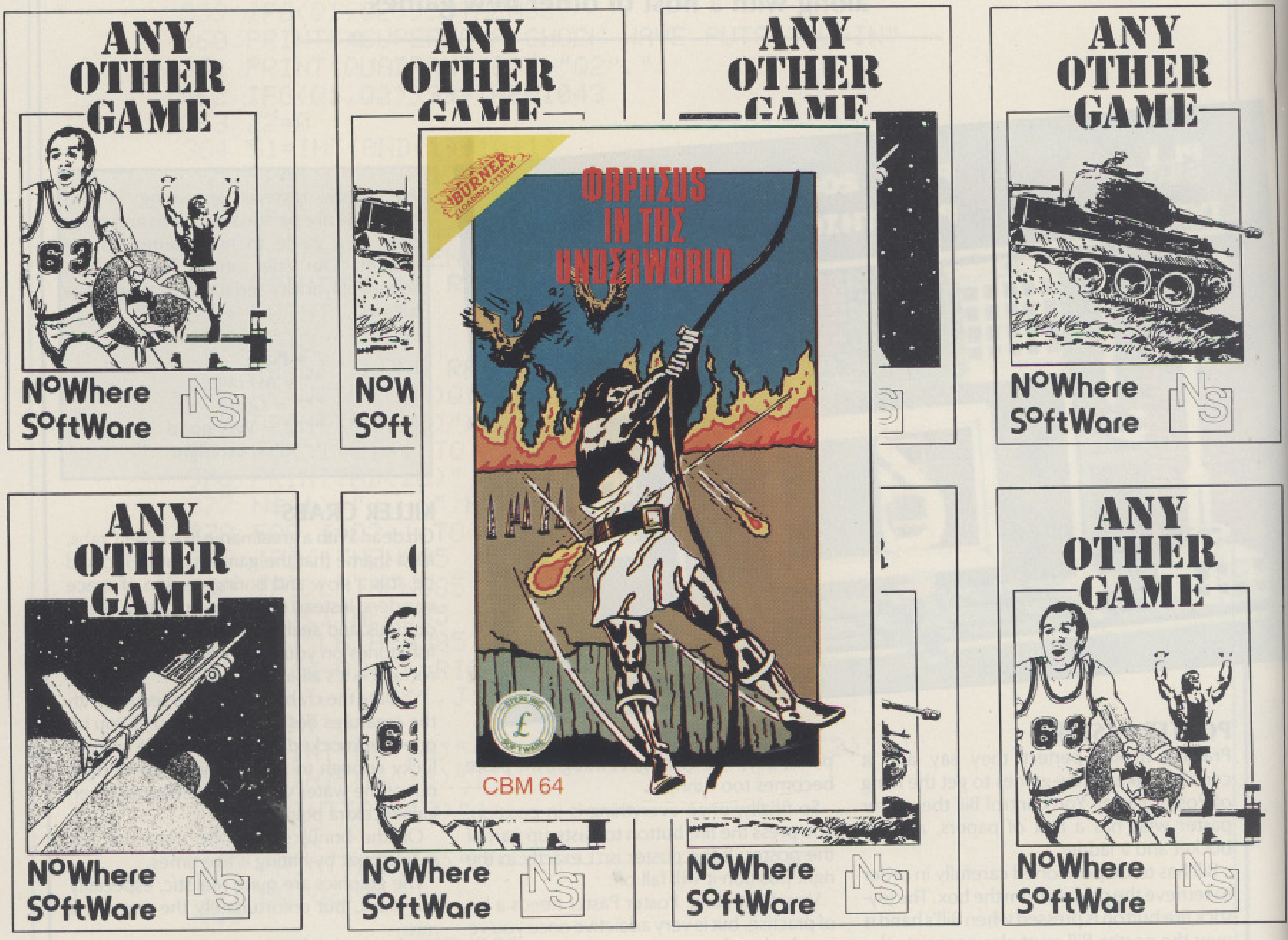
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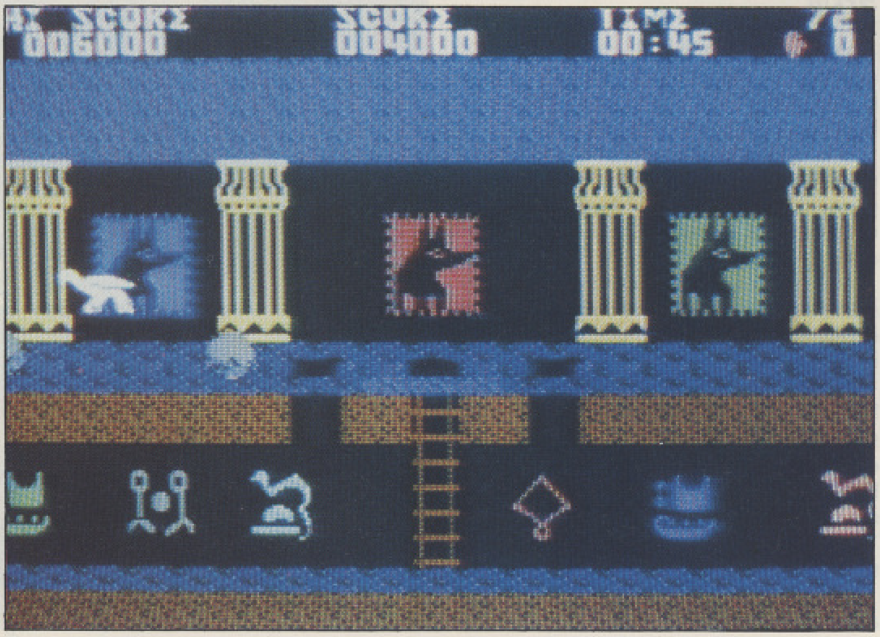


Sterling Software calls this game "wrist breaking stuff" but nerve shattering might be more like it.

Don't take it wrong – Orpheus in the Underworld is good. Perhaps the tension is part of what makes it effective and drives you onward to find your treasures beneath the earth. Each of the 120 screens of the game is divided into two levels. Ladders and certain holes on the upper level expedite your descent to the lower level if you choose. But beware of trap doors in the floors. From such a descent you will not return, unless you have one of your three lives remaining, that is.

Orpheus shows much thought and effort put into detailed graphics and cheery sound. The rooms and caverns of the Underworld are decorated with columns, pharoahs, tarantulas and Egyptian beasts among other things. But the Underworld is by no means dead. Expanding holes may swallow you, birds may decapitate you and fireballs have absolutely no mercy as they hurl themselves at you. Walking, jumping and climbing actions are done in a well-animated style and background music is entertaining with good sound.

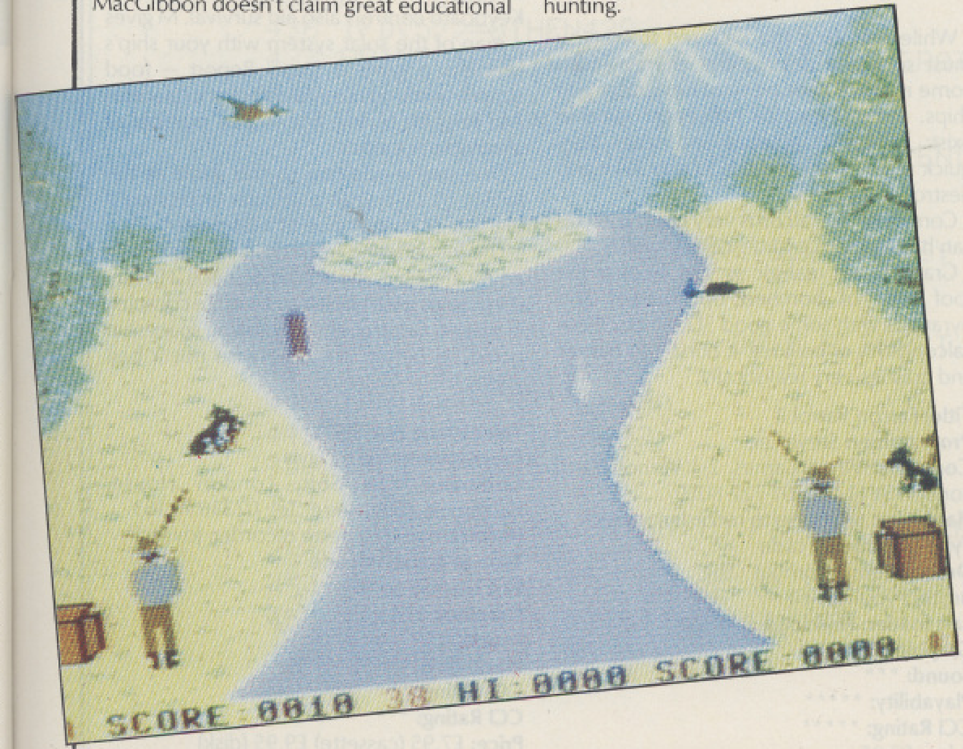
If you manage to avoid these hazards you might gain a treasure or two, but be patient. Fortune don't come easy. Watching the intro for a time gives some idea of where the hazards and treasures are and the game supplies a scoring table.

Title: Orpheus in the Underworld
Programmer: Steve Bak
Company: Sterling Software, Garfield House, 86/88 Edgware Road, London W2 2YW. Tel: 01-258 0066
Hardware: 64, cassette recorder, joystick optional
Type of game: Arcade
Description: Avoid pits, boulders and other dangers to find treasures hidden in rooms and caverns of the Underworld
Fast loader: Burner
Graphics: *****
Sound: ****
Playability: ***
CCI Rating: ****
Price: £6.95 cassette

GUN DOGS

This relatively simple but pleasant game is just the thing for the younger set or for adults who want to venture gently into the world of computer games.

Educational software company Hill MacGibbon doesn't claim great educational value for Gun Dogs but says it is "irresistable" and we're inclined to agree. Though the game contains only one basic setting, it is a colourful nature scene of river, field and forest. Gun Dogs is not for the RSPCA set, however, since it involves duck hunting.



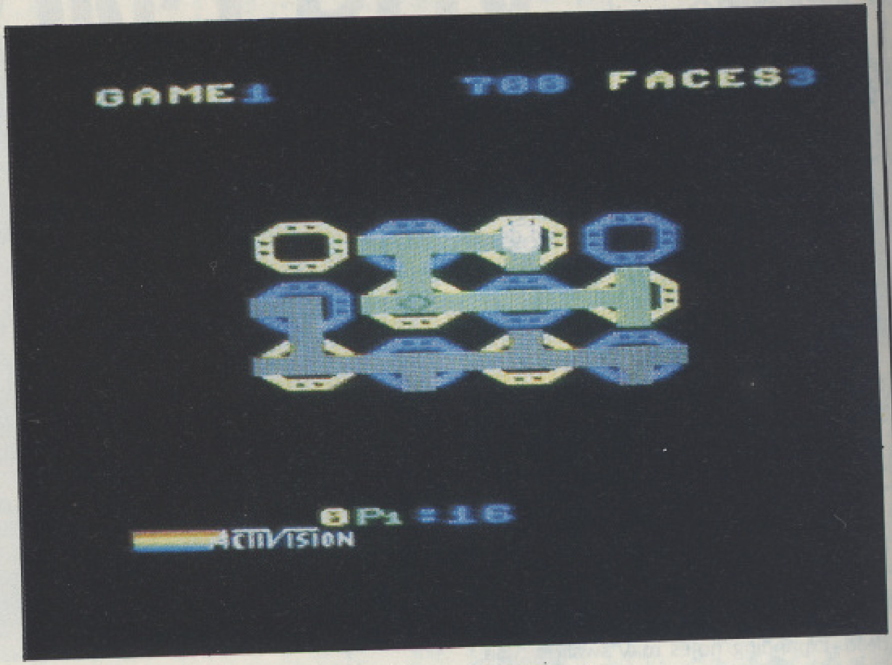
As the player, you control the hunter's rifle to shoot ducks flying overhead as well as the dog to retrieve dead birds from field, stream or island and bring them back to the box by your master's feet. While swimming across the stream you must take care that the gun dog avoids any of three hazards: drowning, logs and deadly fish.

On a higher level, a fox might sneak out of the forest to snatch the gathered ducks. Better yet, play with someone else. In that case, you both get the chance to pinch each other's ducks and take them for your own.

Unfortunately, the only bits of sound are an introductory tune, gunshots and falling ducks. Giving the dogs a bark and the river a splash would have been nice touches to an otherwise nifty game.

Title: Gun Dogs
Programmer: Andromeda Software
Company: Hill MacGibbon Ltd, St. Bartholomew House, 92 Fleet Street, London EC4Y 1DH. Tel: 01-353 6482
Hardware: 64, cassette recorder, one or two joysticks
Type of game: Arcade
Description: Shoot hunter's rifle when he is pointing at a duck and control dog to fetch dead ducks
Fast loader: None
Graphics: ****
Sound: *
Playability: ***
CCI Rating: ****
Price: £5.95 cassette

ZENJI



Another maze game with a simple concept – addictive, but very frustrating. The object of the game is to connect all the maze elements by a green path.

You are a rotating head and by joystick control you move into the centre of each element and try to connect yourself to the next element by moving left, right, up or down.

Most parts of the maze are grey when you start and you must find successful combinations to ensure the whole maze becomes green.

The whole task is made more difficult because you have a time limit and you can see the seconds ticking away at the bottom of the screen. You have four lives – one is lost every time you fail to complete the maze in time.

The less time taken to 'green' the maze, the more points earnt.

Extra points are awarded for connecting to a numbered element.

When complete connection is made (Zenji), the next maze becomes more difficult with flames of desire appearing that must be avoided at pain of losing a life. At higher levels, these flames emit illusions.

The game has a two-player option and eight different skill levels – four for each player. After each game the highest scores can be entered onto a table so that the days results can be kept on display.

Not the best offering from Activision, but well worth a play if you a maze game fan.

Title: Zenji
Programmer: Matt Hubbard
Company: Activision, 15 Harley House, Marylebone Road, London NW1. Tel: 01-486 7588
Hardware: 64, cassette recorder, joystick
Type of game: Maze
Description: Connect all elements to the source
Fast loader: none
Graphics: ***
Sound: ***
Playability: ***
CCI Rating: ***
Price: £9.99

SPACE ACE 2101

The year is 2101 and you are in control of the Ecliptic Plane Strato Cruiser patrolling the Mhiken system. The system has four worlds: Creeton, Kayudrea, Mhiken and Zegnah. The object of the game is... stay alive!

Some original ideas appear in the game. Money not points are gained from destroying as many aliens as possible. With the money gained, fuel, food, anti-virus protection and amunition can be purchased from the various stores to be found on each planet.

You start on Mhiken, the most hospitable planet and you have the choice between landing or going into orbit. A free $2000 will start you off, but watch for alien ships. You may exit into orbit where a sensitive joystick is needed to blast fast-moving alien ships out to prevent you from reaching other planets.

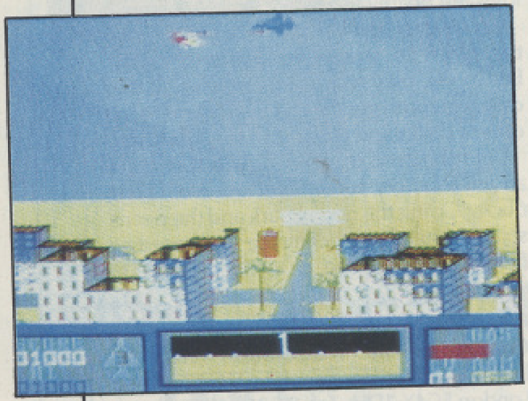
Eight different levels of skill are offered – the higher the level the easier the game. Keyboard controls also aid survival. M gives a map of the solar system with your ship's position. S gives a Status Report – food supply, immunity to viral infection, bounties and rewards owing, fine to pay, number of aliens in area, etc.

One useful addition to the game is the facility to save your particular effects on a blank tape to continue at a later date.

The first offering from Ozi Soft (obviously an Australian company!) Space Ace 2101 incorporates good ideas, and is quite complex in places. Control of the scrolling spaceship could be better, but otherwise not a bad game.

Title: Space Ace 2101
Programmer: Mike Davis
Company: Ozi Soft, London House, Baughurst, Hampshire. Tel: 07356 71163
Hardware: 64, cassette recorder, joystick
Type of game: Arcade
Fast loader: none
Graphics: ***
Sound: ***
Playability: ***
CCI Rating: ***
CCI Rating: ***
Price: £7.95 (cassette) £9.95 (disk)

FALCON PATROL II



An excellent game from Virgin. Programmer Steve Lee must be congratulated on a fine piece of work.

Once Falcon Patrol is up and running (we had a few problems loading), it's all action and the odds are definately not in your favour. You are in command of the Falcon, armed with 100 missiles and a radar system which tells you where the enemy is coming from and at what height. It also tells you positions of landing pads so that you can refeul and rearm when needed – but only if it is safe and you land correctly.

While patrolling the battered town, you must seek and destroy the enemy which come in wave after wave of helicopter gun ships. Three types of helicopter gunship exist: transport, gunship and solo. Very quick reflexes are needed to stay alive and destroy the enemy.

Control of the Falcon is very good and you can hover, climb and descend at will.

Graphics are realistic as you fly over the roof tops of bombed out houses and pyramids with some good 3D effects. If the Falcon is hit or collides, it burst into flames and crashes very realistically.

Title: Falcon Patrol II
Programmer: Steve Lee
Company: Virgin Games, 2-4 Vernon Yard, London W11. Tel: 01-727 8070
Hardware: 64, cassette recorder, joystick
Type of game: Arcade
Description: Combat the enemy and protect your town
Fast loader: Flashload
Graphics: *****
Sound: ***
Playability: *****
CCI Rating: *****
Price: £7.95

```
404 PRINT"PHASERS LOCKED ON TARGET. ENERGY"
405 PRINT"AVAILABLE ="E
406 PRINT"NO. OF UNITS TO FIRE ";
407 IFH1$="YES"THEN409
408 IFH1$<>"Y"THENPRINT"?";:GOTO411
409 PRINT"WITH EACH BURST ?"
410 H9=2
411 INPUT#2,XX$:PRINT:X=VAL(XX$)
412 IFX<=0THEN210
413 IFE-X*H9<=0THEN404
414 FOR H1=1 TO H9
415 E=E-X
416 IFK3=0THEN432
417 W2=K3
418 FORI=1 TO 10
419 IFK(I,3)<=0THEN428
420 H=(X)/(FNO(I))*(3.0*RND(1))
421 K(I,3)=K(I,3)-(H/W2)
422 PRINT"▒"H/W2"UNIT HIT ON KLINGON AT"
423 PRINT"SECTOR"K(I,1)"-"K(I,2)
424 PRINT"("K(I,3)"LEFT)"
425 IFK(I,3)>0THEN428
426 GOSUB594
427 IFK9<=0THEN671
428 NEXT I
429 NEXT H1
430 IFK3<=0THEN433
431 GOSUB608
432 IFE<=0THEN653
433 GOTO210
434 :
435 H9=1:E4=0
436 IFD(5)>=0THEN439
437 PRINT"▒PHOTON TUBES ARE NOT OPERATIONAL."
438 GOTO210
439 IFP>0THEN442
440 PRINT"▒ALL PHOTON TORPEDOES EXPENDED."
441 GOTO210
442 IFC5=0THEN446
443 PRINT"▒YOU MUST LOWER YOUR ENERGY SHIELDS ";
444 PRINT"TO   FIRE."
445 GOTO214
446 PRINT"▒DO YOU WANT A DOUBLE BURST ?";
447 INPUT#2,H1$:PRINT
448 IFH1$="YES"THEN450
449 IFH1$<>"Y"THEN452
450 IFP<2THEN454
451 H9=2
452 PRINT"▒DO YOU WISH TO FIRE A SPREAD ?";
453 INPUT#2,M$:PRINT
454 PRINT"▒TORPEDO COURSE (1-8.9999) :";
455 INPUT#2,H0$:PRINT:H0=VAL(H0$)
456 FOR H1=1 TO H9
```

```
457 IFH9<>2THEN459
458 PRINT"■BURST NUMBER"H1
459 C1=H0
460 IFC1=0THEN210
461 IFC1<1THEN454
462 IFC1>=9THEN454
463 IFP<3*H9THEN466
464 IFM$="YES"THEN797
465 IFM$="Y"THEN797
466 IFRND(1)<.92THEN474
467 PRINT"  TORPEDO MISFIRES."
468 C1=C1+RND(1)*8+1
469 IFC1<9.0THEN471
470 C1=C1-8.0
471 IFE4=0THEN474
472 PRINT"■REMAINDER OF SPREAD ABORTED."
473 E4=0
474 GOSUB537
475 X=S1:Y=S2
476 P=P-1:U2=-1
477 PRINT"TORPEDO TRACK    "
478 X=X+X1
479 Y=Y+X2
480 IFX<.5THEN526
481 IFY<.5THEN526
482 IFX>10.5THEN526
483 IFY>10.5THEN526
484 X5=INT(X+.5)
485 Y5=INT(Y+.5)
486 PRINTX5TAB(19)"-"Y5
487 U2=U2+1
488 IFQ(X5,Y5)<>0THEN490
489 GOTO478
490 F7=Q(X5,Y5)
491 IFF7=1THEN478
492 IFF7=2THEN699
493 IFF7=3THEN506
494 IFF7=4THEN512
495 IFF7=5THEN478
496 IFF7=6THEN690
497 PRINT"■*** KLINGON DESTROYED ***"
498 K3=K3-1
499 K9=K9-1
500 IFK9<=0THEN671
501 FOR I=1 TO 9
502 IFK(I,1)<>X5THEN505
503 IFK(I,2)<>Y5THEN505
504 GOTO518
505 NEXT I
506 Q(X5,Y5)=0
507 PRINT"■**STARBASE DESTROYED...";
508 PRINT"CONGRATULATIONS**";
509 B3=B3-1
```

```
510 C$="RIDICULOUS":POKE53280,4
511 GOTO523
512 Q(X5,Y5)=0
513 PRINT"▒*** STAR DESTROYED ***"
514 S3=S3-1
515 IFS3>=0THEN523
516 S3=0
517 GOTO523
518 K(I,3)=0
519 Q(X5,Y5)=0
520 IFF7<>6THEN523
521 Z3=Q1:Z4=Q2
522 GOSUB1211
523 G(Q1,Q2)=K3*100+B3*10+S3
524 C0(Q1,Q2)=G(Q1,Q2)
525 GOTO527
526 PRINT"▒TORPEDO MISSED."
527 IFE4=0THEN532
528 E4=E4+1
529 IFE4>3.5THEN531
530 GOTO804
531 IFK3<=0THEN535
532 NEXT H1
533 GOSUB608
534 IFE<=0THEN653
535 E4=0
536 GOTO210
537 X2=COS((C1-1)*.785398)
538 X1=-SIN((C1-1)*.785398)
539 RETURN
540 W9=RND(1)
541 IFT>T0+8.99THEN545
542 PRINT"▒WARP 12 CANNOT BE USED UNTIL";
543 PRINT"STARDATE"CHR$(13)T0+9
544 GOTO231
545 GOSUB608
546 IFE<=0THEN659
547 PRINT"]SPEED APPROACHING WARP 12. ENGINES"
548 PRINT"OPERATING ABOVE DANGER LEVEL. ALL ";
549 PRINT"SAFETYDEVICES DISFUNCTIONAL. CRITICAL"
550 PRINT"OVERHEATING--SPONTANEOUS IMPLOSION".
551 PRINT"IMMINENT."
552 IFW9>=.40THEN560
553 FOR I=1 TO 4
554 PRINT"********************";
555 NEXT I
556 GOSUB1093
557 PRINT" ** ENTROPY OF "N$" MAXIMIZED **"
558 PRINT
559 GOTO1301
560 IFW9>=.55THEN566
561 PRINT
562 PRINT"▒YOU ARE TRAVELLING BACK IN TIME."
```

```
563 T=T-9
564 PRINT"■*** STARDATE ="T
565 GOTO250
566 PRINT"■YOU ARE TRAVELLING BACK IN TIME."
567 T=T-14
568 PRINT"■*** STARDATE ="T
569 GOTO250
570 IFW9>=.70THEN576
571 PRINT"■YOU ARE TRAVELLING FORWARD IN TIME."
572 T=T+2
573 IFT>T0+T9THEN653
574 PRINT"■*** STARDATE ="T
575 GOTO250
576 PRINT
577 PRINT"NUCLEAR REACTOR CHAIN REACTION ";
578 PRINT"QUENCHED."
579 PRINT"*** TIME PORTAL MISSED ***"
580 GOTO250
581 :
582 IFD(6)>=0THEN587
583 PRINT"■DAMAGE CONTROL REPORT IS NOT";
584 PRINT"AVAILABLE."
585 PRINT
586 GOTO210
587 PRINT"■■DEVICE"TAB(20)"STATE OF REPAIR"
588 FOR I=1 TO 7
589 PRINTF$(I);TAB(20)D(I)
590 NEXT I
591 PRINT
592 GOTO210
593 :
594 PRINT"■*** KLINGON AT SECTOR"K(I,1)"-";
595 PRINTK(I,2);"DESTROYED.■"
596 X5=K(I,1)
597 Y5=K(I,2)
598 IFQ(X5,Y5)<>6THEN602
599 Z3=Q1
600 Z4=Q2
601 GOSUB1211
602 K3=K3-1
603 K9=K9-1
604 Q(X5,Y5)=J
605 G(Q1,Q2)=K3*100+B3*10+S3
606 C0(Q1,Q2)=G(Q1,Q2)
607 RETURN
608 :
609 GOSUB1093
610 IFK3<=0THEN652
611 IFC$<>"DOCKED"THEN615
612 PRINT"STARBASE SHIELDS PROTECT THE "
613 PRINTN$
614 RETURN
615 IFC5<>0THEN715
```

(continued on page 68)

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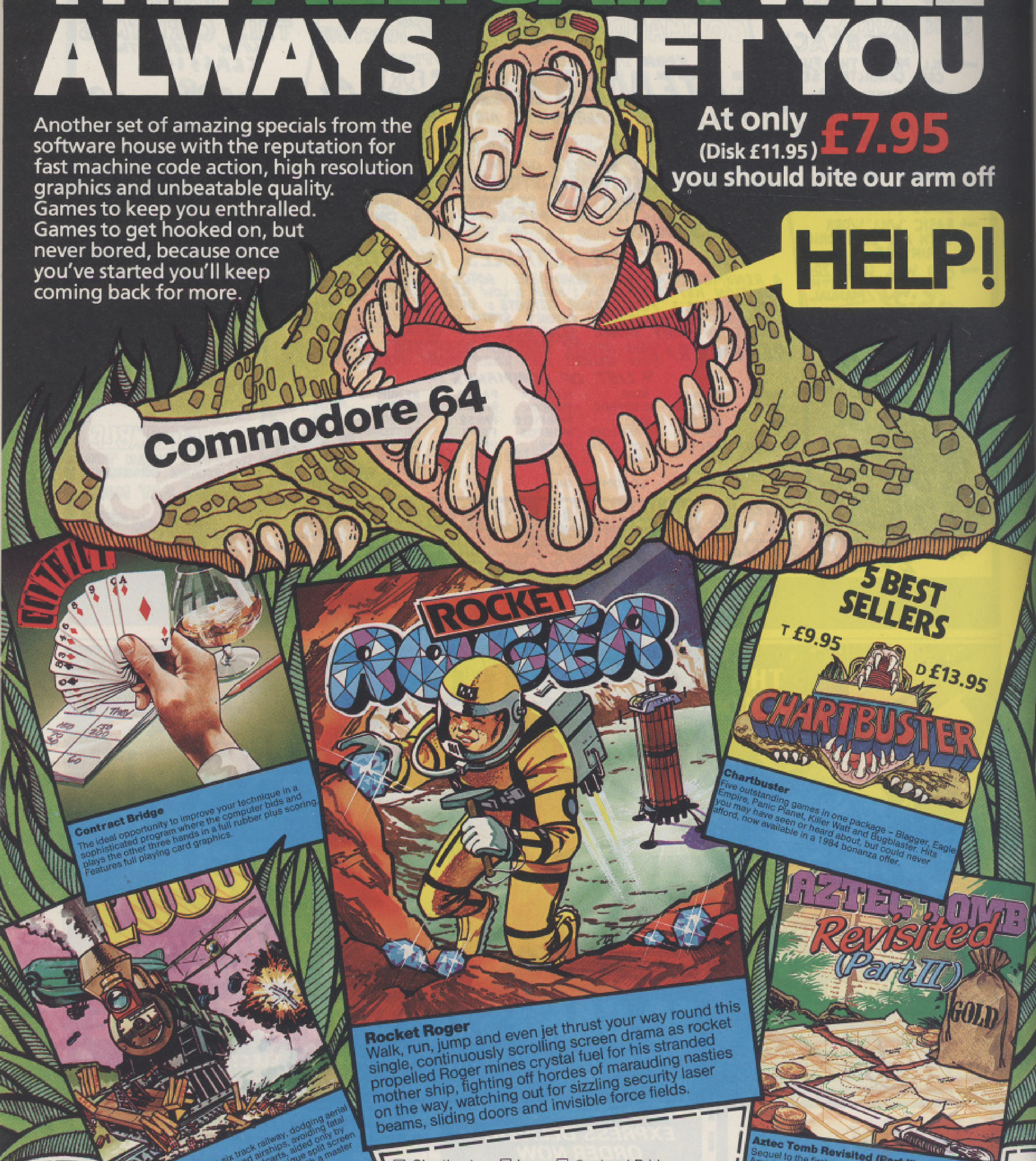

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ABC of sorts

Sort string arrays into alphabetically ascending order with this speedy Machine Code routine from Richard Franklin.

This routine will bubble sort any string array of one dimension and at least two elements into alphabetically ascending order. Null strings are taken as smallest and put first. If one string is, say, "sort" and another is "sorting", the longer string will be put after the shorter one. Strings of any legal length (0-255) are acceptable.

The method for the sort is to loop for the number of elements in an outer loop and then an inner loop which will make one pass of the array. If any strings are swapped, a flag is set. If the flag is clear after the inner loop pass, the array is sorted and no more need be done. Because of the fact that at least one element will be left in its correct position after one pass of the inner loop (which will be the last element of the pass), each pass of the outer loop will cause the inner loop to be one less until in the final outer loop, the inner loop will just check the first two elements.

The routine was taken from 'LIBRARY OF PET SUBROUTINES' and converted to the 64 for a book called 'ADVANCED COMMODORE 64 BASIC REVEALED' to be published soon by Granada Publications.

Syntax:

SYS(49152), string array name.

The string array name must be one or two bytes long (without the '$'). For example to sort the array A$:
SYS(49152),A

Errors produced:

There are three error messages produced by this routine:

ARRAY NOT FOUND – if the array does not exist.
INCORRECT DIMENSION – if the array has more than 1 dimension (e.g. A$(5,5))
INSUFFICIENT ELEMENTS – if the array has been dimensioned with only one element (e.g. A$(0)).

The routine is presented in two forms, Basic loader which anyone can type in, and Source code listing for anybody with an assembler. The source code will also provide useful ideas to machine code programmers.

```
0000              *      =$C000
C000  20 FD AE    SORT   JSR $AEFD       ;SCAN PAST COMMA
C003  20 79 00           JSR $0079       ;GET 1ST CHAR NAME
C006  8D CE C1           STA CA          ;STORE IT
C009  20 73 00           JSR $0073       ;GET 2ND CHAR
C00C  08                 PHP
C00D  09 80              ORA ##$80       ;SET HIGH BIT
C00F  8D CF C1           STA CB          ;STORE IT
C012  28                 PLP             ;NULL 2ND?
C013  F0 06              BEQ SORT00      ;YES
C015  20 73 00           JSR $0073       ;CHARGET FOR NEXT COMMAND
C018  4C 20 C0           JMP SORT01
C01B  A9 80       SORT00 LDA ##$80
C01D  8D CF C1           STA CB
C020              ;
C020  A5 2F       SORT01 LDA $2F         ;SET POINTER
C022  85 22              STA $22         ; TO ARRAY
C024  A5 30              LDA $2F+1
C026  85 23              STA $22+1
C028              ;
C028  A5 22       SORT02 LDA $22         ;END OF ARRAYS?
C02A  C5 31              CMP $2F+2
```

```
00023  C02C   D0 0B          BNE SORT03       ;NO
00024  C02E   A5 23          LDA $22+1
00025  C030   C5 32          CMP $2F+3
00026  C032   D0 05          BNE SORT03       ;NO
00027  C034   A9 00          LDA #$00         ;ARRAY NOT FOUND
00028  C036   4C 79 C1       JMP SORT21
00029  C039           ;
00030  C039   A0 00   SORT03 LDY #$00
00031  C03B   B1 22          LDA ($22),Y
00032  C03D   CD CE C1       CMP CA           ;NAME CORRECT?
00033  C040   D0 08          BNE SORT04       ;NO
00034  C042   C8             INY
00035  C043   B1 22          LDA ($22),Y
00036  C045   CD CF C1       CMP CB
00037  C048   F0 1E          BEQ SORT05       ;YES
00038  C04A           ;
00039  C04A   A0 02   SORT04 LDY #$02         ;ADD LENGTH OF ENTRY
00040  C04C   B1 22          LDA ($22),Y      ; TO POINTER AND
00041  C04E   8D D8 C1       STA TEMP         ; CHECK NEXT
00042  C051   C8             INY
00043  C052   B1 22          LDA ($22),Y
00044  C054   8D D9 C1       STA TEMP+1
00045  C057   18             CLC
00046  C058   A5 22          LDA $22
00047  C05A   6D D8 C1       ADC TEMP
00048  C05D   85 22          STA $22
00049  C05F   A5 23          LDA $22+1
00050  C061   6D D9 C1       ADC TEMP+1
00051  C064   85 23          STA $22+1
00052  C066   90 C0          BCC SORT02       ;ALWAYS
00053  C068           ;
00054  C068   A0 04   SORT05 LDY #$04
00055  C06A   B1 22          LDA ($22),Y      ;GET ARRAY DIMENSION
00056  C06C   C9 01          CMP #$01
00057  C06E   F0 05          BEQ SORT06       ;ONLY 1 DIMENSION
00058  C070   A9 01          LDA #$01         ;INCORRECT DIMENSION
00059  C072   4C 79 C1       JMP SORT21
00060  C075           ;
00061  C075   A0 05   SORT06 LDY #$05
00062  C077   B1 22          LDA ($22),Y      ;GET NUMBER OF ELEMENTS
00063  C079   8D D1 C1       STA NOOFE+1
00064  C07C   C8             INY
00065  C07D   B1 22          LDA ($22),Y
00066  C07F   8D D0 C1       STA NOOFE
00067  C082   AD D1 C1       LDA NOOFE+1      ;ENOUGH ELEMENTS?
00068  C085   D0 0C          BNE SORT07       ;YES
00069  C087   AD D0 C1       LDA NOOFE
00070  C08A   C9 02          CMP #$02
00071  C08C   B0 05          BCS SORT07       ;YES
00072  C08E   A9 02          LDA #$02         ;TOO FEW ELEMENTS
00073  C090   4C 79 C1       JMP SORT21
00074  C093           ;
00075  C093   AD D0 C1 SORT07 LDA NOOFE       ;SET COUNTDOWN
00076  C096   8D D2 C1       STA NOOFC        ; FOR NUMBER OF
00077  C099   AD D1 C1       LDA NOOFE+1      ; MAIN SORT LOOPS
00078  C09C   8D D3 C1       STA NOOFC+1
00079  C09F           ;
00080  C09F   A9 00   SORT08 LDA #$00         ;MAIN LOOP OF SORT
00081  C0A1   8D DA C1       STA FLAGS        ;RESET SWAP FLAG,
00082  C0A4   8D D6 C1       STA COUNT        ; AND ILOOP COUNT
00083  C0A7   8D D7 C1       STA COUNT+1
00084  C0AA   CE D2 C1       DEC NOOFC        ;DECREASE OLOOP COUNT
00085  C0AD   AD D2 C1       LDA NOOFC
00086  C0B0   C9 FF          CMP #$FF
00087  C0B2   D0 03          BNE SORT09
00088  C0B4   CE D3 C1       DEC NOOFC+1
00089  C0B7           ;
00090  C0B7   AD D3 C1 SORT09 LDA NOOFC+1     ;END OF SORT?
00091  C0BA   D0 06          BNE SORT10       ;NO
00092  C0BC   AD D2 C1       LDA NOOFC
00093  C0BF   D0 01          BNE SORT10       ;NO
00094  C0C1   60             RTS              ;YES, DONE
00095  C0C2
```

```
00096  C0C2  18         SORT10 CLC               ;SET $24 TO $22+7
00097  C0C3  A5 22             LDA $22
00098  C0C5  69 07             ADC ##07
00099  C0C7  85 24             STA $24
00100  C0C9  A5 23             LDA $22+1
00101  C0CB  69 00             ADC ##00
00102  C0CD  85 25             STA $24+1
00103  C0CF                ;
00104  C0CF  A0 00      SORT11 LDY ##00          ;INNER LOOP
00105  C0D1  B1 24             LDA ($24),Y      ;GET LENGTH,ADDRESS
00106  C0D3  8D D4 C1          STA LEN1         ; OF 1ST STRING
00107  C0D6  C8                INY
00108  C0D7  B1 24             LDA ($24),Y
00109  C0D9  85 FB             STA $FB
00110  C0DB  C8                INY
00111  C0DC  B1 24             LDA ($24),Y
00112  C0DE  85 FC             STA $FB+1
00113  C0E0  C8                INY
00114  C0E1  B1 24             LDA ($24),Y      ;GET LENGTH,ADDRESS
00115  C0E3  8D D5 C1          STA LEN2         ; OF 2ND STRING
00116  C0E6  C8                INY
00117  C0E7  B1 24             LDA ($24),Y
00118  C0E9  85 FD             STA $FD
00119  C0EB  C8                INY
00120  C0EC  B1 24             LDA ($24),Y
00121  C0EE  85 FE             STA $FD+1
00122  C0F0  AE D5 C1          LDX LEN2         ;LEN(STR2)=0?
00123  C0F3  F0 53             BEQ SORT17       ;YES, DON'T SWAP
00124  C0F5  AE D4 C1          LDX LEN1         ;LEN(STR1)=0?
00125  C0F8  F0 28             BEQ SORT16       ;YES, SWAP THEM
00126  C0FA  A0 00             LDY ##00
00127  C0FC  B1 FB      SORT12 LDA ($FB),Y      ;COMPARE $FB
00128  C0FE  D1 FD             CMP ($FD),Y      ; WITH $FD
00129  C100  F0 05             BEQ SORT13       ;SAME
00130  C102  90 44             BCC SORT17       ;DIFFERENT, DON'T SWAP
00131  C104  4C 22 C1          JMP SORT16       ;DIFFERENT, SWAP
00132  C107                ;
00133  C107  C8         SORT13 INY               ;LENGTH=256?
00134  C108  F0 3E             BEQ SORT17       ;YES, DON'T SWAP
00135  C10A  CC D4 C1          CPY LEN1         ;END OF STR1?
00136  C10D  90 04             BCC SORT14       ;NO, CHECK STR2
00137  C10F  F0 07             BEQ SORT15       ;YES
00138  C111  B0 05             BCS SORT15       ;ALWAYS
00139  C113                ;
00140  C113  CC D5 C1   SORT14 CPY LEN2          ;END OF STR2?
00141  C116  90 E4             BCC SORT12       ;NOT YET
00142  C118                ;
00143  C118  AD D4 C1   SORT15 LDA LEN1          ;LEN1=LEN2?
00144  C11B  CD D5 C1          CMP LEN2
00145  C11E  F0 28             BEQ SORT17       ;YES, DON'T SWAP
00146  C120  90 26             BCC SORT17       ;NO, LEN1<LEN2
00147  C122                ;
00148  C122  A0 00      SORT16 LDY ##00          ;SWAP, STR1=STR2
00149  C124  AD D5 C1          LDA LEN2         ; AND VICE VERSA
00150  C127  91 24             STA ($24),Y
00151  C129  C8                INY
00152  C12A  A5 FD             LDA $FD
00153  C12C  91 24             STA ($24),Y
00154  C12E  C8                INY
00155  C12F  A5 FE             LDA $FD+1
00156  C131  91 24             STA ($24),Y
00157  C133  C8                INY
00158  C134  AD D4 C1          LDA LEN1
00159  C137  91 24             STA ($24),Y
00160  C139  C8                INY
00161  C13A  A5 FB             LDA $FB
00162  C13C  91 24             STA ($24),Y
00163  C13E  C8                INY
00164  C13F  A5 FC             LDA $FB+1
00165  C141  91 24             STA ($24),Y
00166  C143  A9 01             LDA ##01         ;FLAG SWAP
00167  C145  8D DA C1          STA FLAGS
00168  C148
```

```
00169  C148  EE D6 C1     SORT17 INC COUNT          ;INCREMENT INNER
00170  C14B  D0 03               BNE SORT18         ; LOOP COUNT
00171  C14D  EE D7 C1            INC COUNT+1
00172  C150  AD D6 C1     SORT18 LDA COUNT
00173  C153  CD D2 C1            CMP NOOFC          ;DONE?
00174  C156  D0 11               BNE SORT20         ;NO
00175  C158  AD D7 C1            LDA COUNT+1
00176  C15B  CD D3 C1            CMP NOOFC+1
00177  C15E  D0 09               BNE SORT20         ;NO
00178  C160  AD DA C1            LDA FLAGS          ;ANY SWAPS?
00179  C163  F0 03               BEQ SORT19         ;NO, END
00180  C165  4C 9F C0            JMP SORT08         ;DO NEXT LOOP
00181  C168  60           SORT19 RTS                ;ALL DONE
00182  C169  18           SORT20 CLC
00183  C16A               ;
00184  C16A  A5 24               LDA $24            ;INCREASE POINTER BY 3
00185  C16C  69 03               ADC ##$03
00186  C16E  85 24               STA $24
00187  C170  A5 25               LDA $24+1
00188  C172  69 00               ADC #$00
00189  C174  85 25               STA $24+1
00190  C176  4C CF C0            JMP SORT11         ;DO INNER LOOP
00191  C179               ;
00192  C179  0A           SORT21 ASL A              ;SEND ERROR MESSAGE
00193  C17A  A8                  TAY
00194  C17B  B9 8B C1            LDA POINT,Y        ;ADDRESS OF MESSAGE
00195  C17E  AA                  TAX
00196  C17F  C8                  INY
00197  C180  B9 8B C1            LDA POINT,Y
00198  C183  A8                  TAY
00199  C184  8A                  TXA
00200  C185  20 1E AB            JSR $AB1E          ;SEND IT
00201  C188  4C 62 A4            JMP $A462          ;PRINT 'IN...'
00202  C18B               ;
00203  C18B  91 C1        POINT  .WOR STERR1
00204  C18D  A2 C1               .WOR STERR2
00205  C18F  B7 C1               .WOR STERR3
00206  C191  3F 41        STERR1 .BYT '?ARRAY NOT FOUND',$00
00206  C1A1  00
00207  C1A2  3F 49        STERR2 .BYT '?INCORRECT DIMENSION',$00
00207  C1B6  00
00208  C1B7  3F 49        STERR3 .BYT '?INSUFFICIENT ELEMENTS',$00
00208  C1CD  00
00209  C1CE  00           CA     .BYT 0
00210  C1CF  00           CB     .BYT 0
00211  C1D0  00 00        NOOFE  .WOR 0
00212  C1D2  00 00        NOOFC  .WOR 0
00213  C1D4  00           LEN1   .BYT 0
00214  C1D5  00           LEN2   .BYT 0
00215  C1D6  00 00        COUNT  .WOR 0
00216  C1D8  00 00        TEMP   .WOR 0
00217  C1DA  00           FLAGS  .BYT 0
00218  C1DB               .END

ERRORS = 00000

SYMBOL TABLE

SYMBOL VALUE
 CA      C1CE    CB      C1CF    COUNT   C1D6    FLAGS   C1DA
 LEN1    C1D4    LEN2    C1D5    NOOFC   C1D2    NOOFE   C1D0
 POINT   C18B    SORT    C000    SORT00  C01B    SORT01  C020
 SORT02  C028    SORT03  C039    SORT04  C04A    SORT05  C068
 SORT06  C075    SORT07  C093    SORT08  C09F    SORT09  C0B7
 SORT10  C0C2    SORT11  C0CF    SORT12  C0FC    SORT13  C107
 SORT14  C113    SORT15  C118    SORT16  C122    SORT17  C148
 SORT18  C150    SORT19  C168    SORT20  C169    SORT21  C179
 STERR1  C191    STERR2  C1A2    STERR3  C1B7    TEMP    C1D8

END OF ASSEMBLY
```

```
616 J=0
617 FORI=1TO10
618 J=J+K(I,3)
619 NEXT I
620 IF(J+200)<ETHEN636
621 IFN1<>0THEN636
622 PRINT"⊐----KLINGON COMMANDER TO ";
623 PRINT"ENTERPRISE-----";
624 PRINT"▧SO YOU WELL KNOW, YOU ARE ";
625 PRINT"DANGEROUSLY"
626 PRINT"LOW ON ENERGY AND WILL PROBABLY BE"
627 PRINT"DESTROYED BY MY NEXT ATTACK. AS AN"
628 PRINT"OFFICER AND A GENTLEMAN, ";
629 PRINT"I OFFER YOU THE";
630 PRINT"CHANCE TO SAVE YOURSELF AND CREW---"
631 PRINT"DO YOU SURRENDER ?";
632 INPUT#2,S$:PRINT
633 IFS$="YES"THEN635
634 IFS$<>"Y"THEN636
635 A7=1:N9=1:GOTO652
636 U=3
637 PRINT
638 FOR I=U3 TO 10
639 IFK(I,3)<=0THEN650
640 H=(K(I,3)/FNO(I))*(2+RND(1))
641 E=E-H
642 PRINT"▮▧"H"UNIT HIT ON "N$" FROM"
643 PRINT"KLINGON, SECTOR"K(I,1)"-"K(I,2)
644 IFH<=180THEN649
645 R5=INT(RND(1)*7+1)
646 D(R5)=D(R5)-(H/200)*(1.5*RND(1))
647 PRINT"▧** CRITICAL HIT, ";
648 PRINTF$(R5);" DAMAGED **";
649 PRINT"("E"LEFT)"
650 NEXT I
651 PRINT
652 RETURN
653 :
654 PRINT"⊐▧▧      IT IS STARDATE"T
655 PRINT
656 IFT<T0+T9THEN659
657 PRINT"              TIME HAS RUN OUT AND "
658 GOTO666
659 GOSUB1093
660 PRINT" THE "N$" HAS BEEN DESTROYED"
661 PRINT"       (ENERGY LEFT ="E"UNITS.)"
662 IFK9>1THEN666
663 PRINT"▧  THERE IS STILL ONE KLINGON BATTLE"
664 PRINT"                  CRUISER LEFT."
665 GOTO667
666 PRINT"▧  THERE ARE STILL"K9"KLINGON BATTLE"
667 PRINT"  CRUISERS,  THE FEDERATION WILL BE"
668 PRINT"CONQUERED! YOU HAVE BEEN DESTROYED ";
```

```
669 PRINT"- YOU              MISCALCULATED."
670 GOTO1301
671 :
672 PRINT"⊐";
673 PRINT"    IT IS STARDATE"T
674 PRINT"◙  THE LAST KLINGON BATTLE CRUISER IN"
675 PRINT"  THE GALAXY HAS BEEN DESTROYED. THE"
676 PRINT"FEDERATION HAS BEEN SAVED.";
677 PRINT" YOU HAVE BEEN";
678 PRINT"    PROMOTED TO ◘COMMANDER EMERITUS■."
679 IFN1<>0THEN683
680 PRINT"◙◙ "K0"KLINGONS IN"T-T0"YEARS."
681 PRINT"       RATING ="INT(K0/(T-T0)*1000)
682 GOTO1301
683 PRINT"◙◙ "K0"KLINGONS IN"T-T0"YEARS."
684 IFA7=5THEN687
685 PRINT"◙         ENTERPRISE CAPTURED."
686 GOTO1301
687 PRINT"◙ ENTERPRISE DESTROYED INTENTIONALLY."
688 PRINT"     RATING ="INT(K0/(T-T0)*1000-5000)
689 GOTO1301
690 :
691 IFRND(1)<(U2*4)/100THEN712
692 IFRND(1)>.4THEN497
693 FOR I=1 TO 10
694 IFK(I,1)<>X5THEN698
695 IFK(I,2)<>Y5THEN698
696 K(I,3)=K(I,3)-(580/(SQR(U2+1)))
697 GOTO0706
698 NEXT I
699 :
700 IFRND(1)<(U2*3)/100THEN712
701 IFRND(1)>0.15THEN497
702 FOR I=1 TO 10
703 IFK(I,1)<>X5THEN710
704 IFK(I,2)<>Y5THEN710
705 K(I,3)=K(I,3)-0.4*K(I,3)-120*RND(1)
706 IFK(I,3)<=0THEN497
707 PRINT"◙** KLINGON EVASIVE ACTION ---"
708 PRINT"* KLINGON DAMAGED BUT NOT DESTROYED *"
709 GOTO0527
710 PRINT
711 GOTO0527
712 PRINT"◙** KLINGON EVASIVE ACTION ---"
713 PRINT"* TORPEDO MISSED *"
714 GOTO0527
715 :
716 FORI=1TO10
717 IFK(I,3)<=0THEN728
718 H=(K(I,3)/FNO(I))*(2*RND(1))
719 A9=A9-H
720 IFA9>0THEN728
721 Z$="DOWN"
```

```
722 U3=I+1
723 PRINT"▒**KLINGONS ATTACK-ENERGY ";
724 PRINT"SHIELDS KNOCKEDOUT**"
725 PRINT
726 C5=0
727 GOTO638
728 NEXT I
729 PRINT"▒**KLINGONS ATTACK-ENERGY ";
730 PRINT"SHIELDS PROTECTTHE "N$" **"
731 GOTO651
732 :
733 F$(1)="WARP ENGINES"
734 F$(2)="S.R. SENSORS"
735 F$(3)="L.R. SENSORS"
736 F$(4)="PHASER CNTRL"
737 F$(5)="PHOTON TUBES"
738 F$(6)="DAMAGE CNTRL"
739 F$(7)="ENERGY SHLDS"
740 RETURN
741 :
742 J=1
743 W1=0
744 W9=RND(1)
745 C1=3
746 T=T+.5
747 IFC$<>"DOCKED"THEN749
748 J=4
749 FOR I=1 TO 7
750 D(I)=D(I)+2*J
751 IFD(I)<0THEN753
752 D(I)=0
753 NEXT I
754 E=E-50
755 GOTO952
756 :
757 PRINT
758 Q(S1,S2)=0
759 K3=K3-1
760 K9=K9-1
761 Z$="DOWN"
762 FOR I=1 TO 9
763 IFK(I,1)<>X3THEN768
764 IFK(I,2)<>Y3THEN768
765 Z6=K(I,1)
766 Z7=K(I,2)
767 GOTO769
768 NEXT I
769 K(I,3)=0
770 GOSUB1093
771 Q(X3,Y3)=A5
772 G(Q1,Q2)=K3*100+B3*10+S3
773 PRINT"***   EMERGENCY ALERT   ***"
774 PRINT"*** COLLISION  IMMINENT ***"
```

```
775 PRINT
776 GOSUB1093
777 PRINT"▨"N$" RAMS KLINGON AT SECTOR"
778 PRINTZ6"-"Z7"."
779 PRINT"*** KLINGON DESTROYED, "N$
780 PRINT"HEAVILY DAMAGED ***"
781 T1=VAL(TI$)
782 IFT1+6>VAL(TI$)THEN782
783 FOR I=1 TO 7
784 D(I)=D(I)-(RND(1)*4+1)
785 NEXT I
786 C5=0
787 E=E-500
788 IFK9<=0THEN671
789 GOSUB608
790 IFE<=0THEN655
791 S1=Z6
792 S2=Z7
793 A=2
794 T1=VAL(TI$)
795 IFT1+6>VAL(TI$)THEN795
796 GOTO587
797 :
798 PRINT"▨SPREAD ANGLE (0.05-0.30) ?";
799 INPUT#2,E5$:PRINT:E5=VAL(E5$)
800 IFE5=0THEN214
801 IFE5<.05THEN798
802 IFE5>.30THEN798
803 E4=1
804 PRINT"▨  NUMBER"E4
805 IFE4>1.5THEN808
806 C1=C1-E5
807 GOTO809
808 C1=C1+E5
809 IFC1>=1.0THEN812
810 C1=C1+8.0
811 GOTO466
812 IFC1<9.0THEN466
813 C1=C1-8.0
314 GOTO466
815 :
816 PRINT"▨▨CURRENT POSITION:■"
817 PRINT"QUADRANT"Q1"-"Q2TAB(20)"SECTOR"S1"-"S2
818 PRINT"STARDATE  :"T
819 IFB3<>1THEN214
820 PRINT"STARBASE AT SECTOR"B1"-"B2"."
821 GOTO214
822 :
823 PRINT"▨▨STAR CHART:■"
824 PRINT
825 C0(Q1,Q2)=G(Q1,Q2)
826 FOR J1=1 TO L8
827 PRINTTAB(5*J1-1)"▨";RIGHT$(STR$(J1),1);
```

```
828 NEXT J1
829 IFL8=6THENPRINTTAB(39)"■ ";
830 FOR I=1 TO L8
831 PRINT:PRINT"▩";RIGHT$(STR$(I),1);"◩■";
832 FOR J1=1 TO L8
833 IFI=Q1ANDJ1=Q2THENPRINT"▩";
834 PRINTTAB(5*J1-LEN(STR$(C0(I,J1))));
835 PRINTSTR$(C0(I,J1));"■";
836 NEXT J1
837 IFL8=6THENPRINTTAB(39);" ";
838 NEXT I
839 GOTO816
840 :
841 IFT>T0+7.99THEN845
842 PRINT"▩DEATH RAY CANNOT BE USED UNTIL"
843 PRINT"STARDATE"T0+8
844 GOTO214
845 IFW3<.05THEN848
846 PRINT"▩DEATH RAY PERMANENTLY OUT OF ORDER."
847 GOTO214
848 IFC5=0THEN851
849 PRINT"▩YOU MUST LOWER YOUR SHIELDS TO FIRE."
850 GOTO214
851 W3=RND(1)
852 PRINT
853 IFW3>.35THEN865
854 PRINT" *ANTI-MATTER OVERLOAD, TEMPORARY"
855 PRINT"  PSEUDO-STARS CREATED FROM ENERGY."
856 FOR I=1 TO 10
857 FOR J=1 TO 10
858 IFQ(I,J)<>0THEN860
859 Q(I,J)=4
860 NEXT J
861 NEXT I
862 W3=RND(1)
863 PRINT
864 GOTO190
865 IFW3>.20THEN869
866 PRINT"▩***  DEATH RAY BACKFIRES  ***"
867 PRINT"*** BETTER LUCK NEXT TIME ***"
868 GOTO553
869 IFW3>.80THEN889
870 PRINT"▩*** DEATH RAY ANNIHILATES ALL ";
871 PRINT"KLINGONS  IN QUADRANT"Q1"-"Q2"."
872 K9=K9-K3
873 IFK9<=0THEN671
874 FOR I=1 TO 10
875 FOR J=1 TO 10
876 IFQ(I,J)<>6THEN878
877 Q(I,J)=0
878 IFQ(I,J)<>2THEN880
879 Q(I,J)=0
880 NEXT J
```

```
881 NEXT I
882 K3=0
883 G(Q1,Q2)=INT(B3*10+S3)
884 Z3=Q1
885 Z4=Q2
886 GOSUB1211
887 W3=RND(1)
888 GOTO214
889 IFW3>.75THEN894
890 PRINT"■*THERMAL REACTOR ENERGY DRAIN."
891 PRINTINT(.95*E)"UNITS OF ENERGY BURNED."
892 E=0.5*E
893 GOTO870
894 IFW3>.95THEN910
895 PRINT"■*MATTER/ANTI-MATTER TRANSFORMATION."
896 IFK3>0THEN898
897 GOTO855
898 PRINT"■KLINGONS HIT BY MAIN BEAM ";
899 PRINT"DUPLICATED."
900 P8=K3
901 PRINT"ENTIRE QUADRANT DISORDERED."
902 FOR I=1 TO P8
903 IFK3>8THEN907
904 K3=K3+1
905 K9=K9+1
906 NEXT I
907 G(Q1,Q2)=K3*100+B3*10+S3
908 W3=RND(1)
909 GOTO364
910 PRINT"■      *** DEATH RAY GOES CRAZY ***"
911 PRINT"**DESTROYS EVERY KLINGON IN THE ";
912 PRINT"GALAXY**";
913 PRINT" *** ALSO DESTROYS THE "N$" ***"
914 T1=VAL(TI$)
915 IFT1+10>VAL(TI$)THEN915
916 IFN1<>0THEN918
917 A7=5:N1=5
918 GOTO671
919 :
920 IFN1=0THEN924
921 PRINT"■THE STINKING GARBAGE SCOW CANNOT BE"
922 PRINT"ABANDONED."
923 GOTO214
924 PRINT
925 IFA7<>1THEN929
926 PRINT"YOU MAY NOT ABANDON SHIP AFTER YOU ";
927 PRINT"HAVE BEEN ASKED TO SURRENDER."
928 GOTO214
929 PRINT"WOULD YOU LIKE TO RECONSIDER ?";
930 INPUT#2,P$:PRINT
931 IFP$="YES"THEN214
932 IFP$="Y"THEN214
933 PRINT"▣";
```

PET takes control

Viola Gienger finds out how LH Fermentation has trained a PET to keep watch over a complex machine

Huddled in the grey Slough mist among a Mars Chocolate factory and Cows Proofing Ltd is the sophisticated technology of LH Fermentation... and a Commodore computer.

Actually, LH keeps two Commodores – a PET and a newer 64 – as part of the high tech design and manufacturing operation for fermenters. The fermentation systems are used to control growth of micro-organisms in biochemical experiments and in producing drugs such as Interferon.

Despite the obvious complexity of the operation, LH has used microcomputers for five years and electronic systems manager John Harris says, "We're very happy with it from a computing aspect."

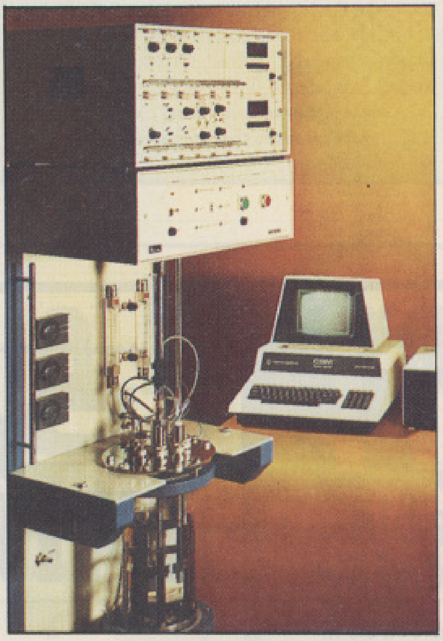
LH Fermentation has been expanding into its new factory over the past six months, but the company was around, though in a different form in Stoke Poges, long before the Commodore computers that are so important to it now.

Established in the 1930s as an engineering firm, LH began making stainless steel aircraft parts during World War II. With the end of the conflict business at LH dropped off. But a nearby pharmaceutical company, Glaxo Holdings Ltd, occasionally solicited parts for their biologically-sensitive fermenters.

"Any metal parts had to be stainless steel," Harris says, explaining that fermentation could be altered by standard metallic objects. "So it was quite a natural transition."

LH adjusted quite easily to its new role in biotechnological design and manufacturing. Harris joined the firm in 1979 and later that year, LH Fermentation demonstrated its first fermenter-to-computer hookup at a Society of Chemical Engineers meeting in London's Belgrave Square.

"We were still making fermenters like they were in the dark ages," Harris says. A scientist could monitor and change conditions inside the fermenter to make the organisms do their bidding, but any information gleaned from the experiment had to be recorded by hand. The result was a mountain of paperwork and more than a molehill of frustration if one figure was off.



Considering the combination of electrical, mechanical, pneumatic and now computer expertise, Harris says, "A complete working system is an absolute joy to behold."

"There was a lot of talk then about optimisation," Harris says. "That has been sort of the objective of the late 20th century in this industry."

Hand recording up to three months of information was not the scientific idea of optimal. "It's just tedious to store, tedious to record. Other than that, having one small set point that's wrong somewhere throws it all off."

LH approached 3D Company about developing interfaces to connect fermenters to the IEEE port on a microcomputer – the Commodore 3032 PET.

"We chose the PET for a couple of reasons," Harris says. "Firstly, it was the first personal computer of its sort to come out – of the new generation of desk top micros. We wanted something that was user friendly, without all the equipment that comes with a mainframe that might scare the user."

The PET was attractive also because it was not specific to one function and owners could use the machine for other jobs at home or in the laboratory. "It was flexible enough that it could be programmed for other things," Harris says.

LH since has upgraded to an 8032 PET, 8050 disk drive and a more sophisticated printer. The wider column width of the 8000 series PET's screen allows more parameters to be charted. "If someone said, 'I want a computer for my fermenter, but I'm not sure what I want,' that's what he'd get," Harris says.

He says a few large companies use main frame computers designed specifically for fermentation control and monitoring, but smaller firms and university departments often turn to the more affordable micros to lessen the costs that come on top of the average £10-12,000 bill for a fermenter and instrumentation.

Among the well-known users of the LH fermenter-Commodore computer combination are University College of London, Teeside Polytechnic and University of Bath. Wellcome Foundation and the government's Public Health Laboratory Service in Port-on-Down are two of the pharmaceutical concerns currently using the system.

LH's two US offices, one in California and the other in Washington DC, use the 64 with peripherals which cost substantially less in America where the 64 first was introduced.

"It was daft really because the so-called sophisticated system was cheaper than the traditional way of doing it," Harris says. The Slough factory now has a 64 in addition to the PETS, the oldest of which is now used only for word processing.

The interface is a standard Digital/Analog, A/D converter with eight character, eight bit data at 0-5 volts. It carries input from the computer to an instrumentation box that rests on top of and controls the fermenter. Small rods inside the fermentation container monitor conditions in parameters such as temperature, Ph level and dissolved oxygen level, all of which can have a dramatic effect on the tiny "bugs" such as yeast or animal cells inside.

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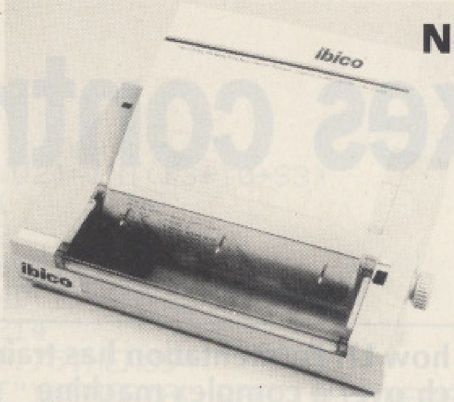

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The researcher can change those conditions or keep them on track to a particular set point by adjusting temperature, the amount of acid or alkaline, etc. — all controllable by computer.

One of the crucial advantages of using a computer is to ease data recording. With a disk drive and printer, information about conditions and how they change over a period of time is recorded on a floppy disk and also can be recorded in chart form on the printer, originally a Teletype 43.

The micro can then be programmed to do mathematical calculations on the input, Harris says, "to actually get the computer to determine what are the actual best conditions for growth within the vessel."

Most buyers program their own systems because each application is different and specific to the customer. But LH Fermentation, which already has expanded since its recent acquisition by Porton International, may eventually offer software for certain functions, Harris says. "Many of our users are biologists and they tended to have avoided mathematical subjects," he says. "They think the computer is the greatest thing but they don't know much about how it works."

The next time your mum catches you with a Martini or Bloody Mary in your hand, just tell her it's made from milk! Well, sort of.

Express Dairies Ltd has developed a process to produce 96 percent alcohol from the waste that results from making cheese. The alcohol is then sold to drinks manufactures who make it into vodka and gin.

The senior technologist in fermentation at Express Dairies, Martin Webber, says his company uses a Commodore PET with an LH fermenter to research better ways of converting the waste, called whey as in "curds and whey," into usable substances.

"It would cost billions for us to dump it straight down a waste disposal system," Webber says.

The lengthy conversion process starts with separation of milk into "Mother Hubbard's" curds and whey. The curds are used to make cheese, but the whey traditionally was discarded. Since 1978, though, Express Dairies has taken the whey a few steps further in fermentation.

Webber explains that protein is extracted to leave what is called whey permeate, which is then fermented with a particular strain of yeast. The result of that is fermented again to make ethanol and a final fermentation yields alcohol. Distilling then purifies the alcohol, readying it for sale to the liquor distillers who dilute that to make either gin or vodka.

Express Dairies has been using the Commodore PET for more than four years, Webber says, to log data from research fermentations. The computer and printer, cheaper than a six-channel chart recorder, are used to produce graphical representations of the data and to control the environment within the fermenter.

"We can control conditions without me having to be there," he says. "I don't have to work nights."

It's a bargain!

At just £199, Ibico's LTR-1 is a budget-priced printer ideal for those who require a letter-quality printer without breaking the piggy bank

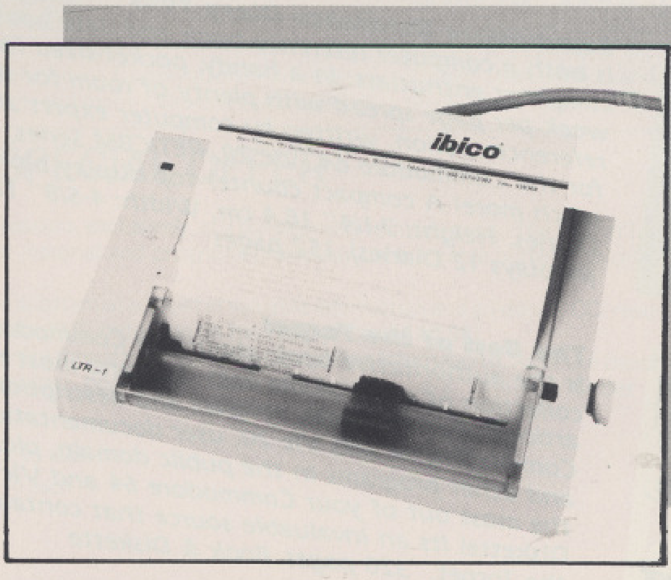
Ibico's LTR-1 printer, first shown at this year's PCW Show, proves that it not necessary to spend a lot of money for a letter-quality printer.

What's the catch? Well, it isn't designed to cater for Commodore graphic symbols, but it does handle letters, lists, files and addresses admirably.

A compact printer with the dimensions of just 292 x 57 x 165mm and a beige casing, the LTR-1 should sit well on any desk.

Compatible with the 64 through a serial or parallel interface, Ibico's printer takes full A4-size paper, either continuous or manual feed.

Other features include Elite type 12 pitch; 80 columns; 96 characters; and 12 cps bi-directional.



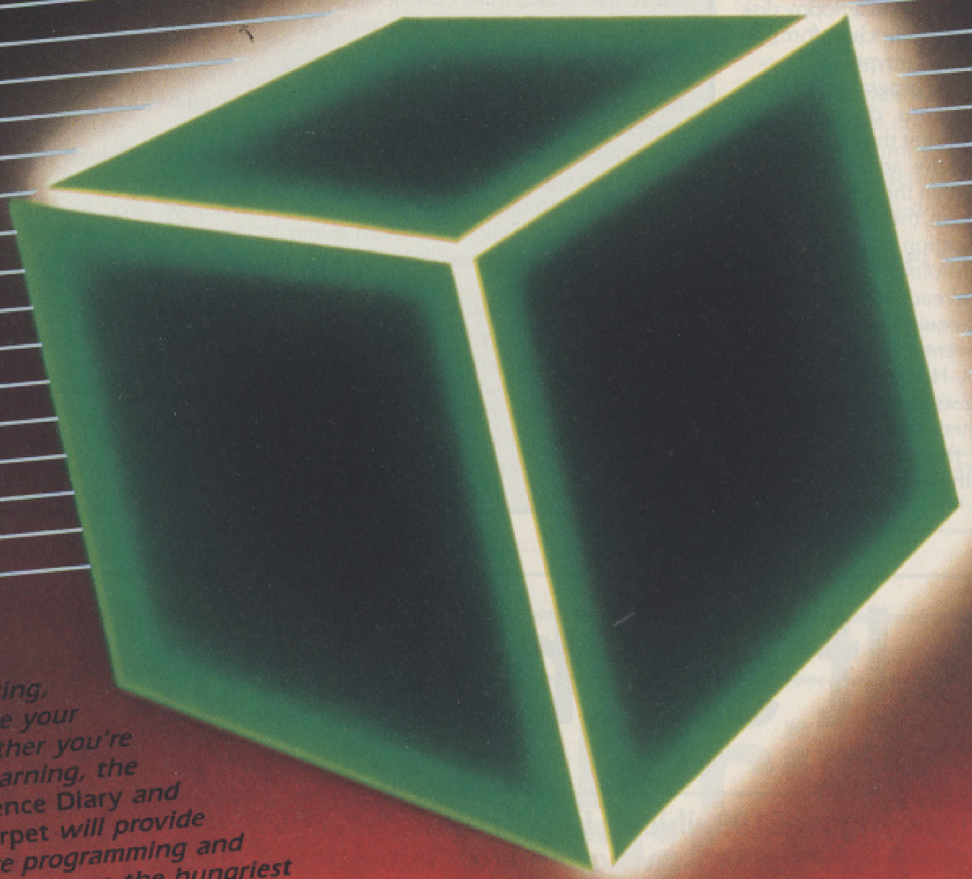
In operation, the LTR-1 is fairly quite. The printing head does make a considerable whirring noise, but it is still far quieter than dot-matrix printers.

It may be a compact model, but the printer is heavy enough to prevent it from sliding around the table while printing.

At £199, Ibico's LTR-1 is well worth considering if your requirements are for a printer which produces letter-quality printing.

Contact: Ibico, 181 Spring Grove Road, Isleworth, Middx. Tel: 01-568 2379.

TWO NEW DIMENSIONS



Here are two exciting, new ways to adore your Commodore. Whether you're a master or just learning, the Commodore Reference Diary and The Best of the Torpet will provide hardware, software programming and information to satisfy even the hungriest Commodore appetite.

Commodore
Reference Diary
1985
Jim Butterfield

Commodore Reference Diary 1985 *is both a computer reference book and date book — the perfect combination for any computer enthusiast. In a handy, pocket-sized format, the diary features a whole week per page spread with plenty of room for those important daily notations. The reference section, written by computer expert Jim Butterfield, features programming for the Commodore 64, Vic 20, PET/CBM Series, B-Series, new Commodore Plus/4, and much more! A compact counter top display bin is included with orders of 12 or more* Diaries. *Height: 7-1/4'' 18.4 cm. Width: 4-5/8'' 11.8 cm. Length: 4-1/2'' 11.4 cm (displays 12 Diaries) 152 pages*

THE TORPET
PLUS
MORE
FOR THE
COMMODORE
64
AND THE
VIC-20

The Best of the Torpet *is the authoritative book about the Commodore 64 and Vic 20. It's an exciting collection of some of the best new and most recent articles written for The Torpet — articles, memory maps, reviews and descriptions of products available for the Commodore 64 and Vic 20, user documentation of the 200 best games, activities, and other programs in the public domain, plus much more! And if you want to get the most out of your Commodore 64 and Vic 20, don't miss* The Best of the Torpet *Diskette! Its an invaluable source that contains all the programs listed in* The Best of the Torpet. *320 pages Book & Diskette*

CANADIAN REPORT

"Commodore owners will find it the most important computer book they own..."

The Best of Torpet – a major book and diskette production is arousing great interest in North America. Bruce Beach, of Canada's Torpet user group recounts the crises and triumphs of Commodoreland's own user club and its publication.

The fates willing, The TORPET will reach its fourth anniversary in December 1984. From small beginnings; there were only 75 subscribers for the first issue, The TORPET has now grown to a sixty thousand reader mailing list.

The TORPET gets its name from the words TORonto, the city where it began, and PET the name of a computer that is no longer made by Commodore. The first readers of what was initially a four page newsletter were the 75 owners of PET computers who had formed the Toronto PET Users Group.

The Toronto club grew very quickly, largely because it had an outstanding guru in Jim Butterfield, who, through both The TORPET and other Commodore magazines, became famous to PET users throughout the world.

Mainly because of The TORPET, the contributions of Jim Butterfield, and the efforts of David Hook in building a large public domain library of PET computer programs, the club grew to the point where most of its members were outside Toronto. Indeed, it had actually become an international club with members in over thirty different countries.

In many ways the history of The TORPET is the history of The Toronto PET Users Group and vice versa. The TORPET was sent to the club members until the readership was over twelve thousand at which time The TORPET became a separate publication and the club began to publish its own magazine.

For a while The TORPET became a controlled publication going to Commodore dealers for distribution to their customers. It was at this time that its circulation grew to over thirty thousand. The TORPET has now become a requested circulation publication going to highschool students in Canada. At one time over fifty percent of The TORPET's circulation was outside of Canada but now once again over ninety-five percent is inside Canada. All a part of its identity crises.

Initially, the only subject discussed in The TORPET was PET computers. As Commodore phased out the PET and brought in the VIC the subject matter of The TORPET also changed. Now Commodore has discontinued the VIC, and the Commodore 64 and other models have gained a prominence. Changes such as these have often been to the chagrin of older readers of The TORPET who have not bought the new computer models as they became available.

The initial readers were more or less rabid computer buffs but this rapidly changed as more and more of the general public began to buy computers and The TORPET. Consequently the editorial content of The TORPET made a similar transition.

The first cummulative volume of The TORPET was called The Whole PET Catalog and it dealt with only the PET and the VIC. The most recent cumulative volume deals almost exclusively with the Commodore 64 although much of what it has to say is relevant to VIC computers and many of the articles are, of course, applicable to computers in general.

Most new Commodore computer owners, and many older ones, will find THE BEST OF THE TORPET the most important computer book that they own. If a user bought his/her Commodore 64 computer after the model transition took place and therefore missed out on all the discussion by the original first users then THE BEST OF THE TORPET is the book that gives them the chance to catch up.

Even older users find the volume extremely useful because everything is gathered together in one place, and in an orderly manner. In addition to well over one hundred articles on every conceivably related subject there are numerous programs listings and descriptions and one of the best and most convenient compilation of computer maps to be found anywhere.

There are descriptions and sources given for what the editor thinks are the 1000 best free public domain programs available anywhere. Many of the articles are extremely entertaining, and the book is even liberally sprinkled with cartoons, as are most issues of The TORPET.

What are the current trends for The TORPET? Well, its readers are becoming younger, more sophisticated, and more cosmopolitan in their computer interests. Today the interest in robotics is probably at about the same level as was the interest in personal computers five years ago.

The TORPET will be watching the trend. It could be that in a few years it will be almost entirely devoted to robotics and that there will be a PET robot named TOR. Life is strange that way, and the computer revolution is even stranger.

SPECIAL OFFER

Commodore Computing International is able to offer its readers, **exclusively**, at a considerably reduced price, 'The Best of Torpet' Book & Diskette. 320 pages long, the book contains a mass of important material and programs previously unobtainable outside Canada, Commodore's home country.

Contributors, including Jim Butterfield who provides a substantial amount of valuable information and guidance. CCI readers can purchase this exciting volume and diskette for only £13.99 — **more than 25% reduction on the retail price of £18.95!**

This outstanding production is only obtainable at this price through **Commodore Computing International**. As Bruce Beach says... 'Commodore owners will find it the most important computer book they own...' Supplies are limited. **Order your copy today!**

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Spirited sprites

Professional and beginner programmers will make use of the Expert Sprite Editor from Android Dreams Software Company.

Along with basic editing commands, the ESE enables editing of 224 Sprites from Basic or machine code with up to eight edited on screen at one time. Owners can use either the joystick or keyboard to edit and any creations can be saved to and loaded from disk or tape.

Animation facilities include moving and stationary animation done with a wide range of commands. Including a manual of technical information, the ESE is priced £8.95.

Contact: Android Dreams Software Company, 94 Rednal Road, Kings Norton, Birmingham B38 8DU. Tel: 021-458 4475

Micro Dealer extends reach

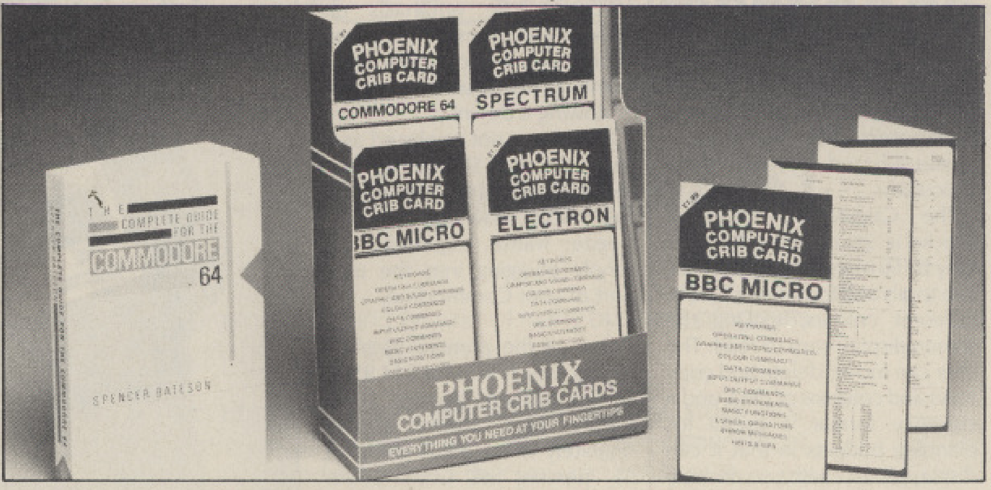
After a march into hardware earlier this year, Hertfordshire based distributor Micro Dealer is extending its coverage into a new range of peripherals for Commodore machines.

Distributed under the brand name Shado, the new string of products includes blank cassette tapes, cassette recorders, printers, floppy disks, joysticks and interfaces.

At the moment only the tapes and recorders are available, but Micro Dealer assures that the remainder of the line will be offered in coming months.

Contact: Micro Dealer UK Ltd, 29 Burrowfield, Welwyn Garden City, Herts AL7 4SS. Tel: (07073) 28181

Programming troubleshooter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Phoenix Computer Crib Cards provide vital, detailed information on various aspects of programming. Topics covered include keywords, operating commands, graphic and sound commands, colour commands, data commands, graphic and sound commands, colour commands, data commands, input/output commands, basic statements and functions, error messages and hints and tips.

Phoenix Publishing says the Crib Cards, available for the 64, are suitable for beginners but also for more experienced programmers. The cards are free standing and made of sturdy, glossy card. Each comes in a protective polythene sleeve. Available now, the Crib Cards sell for £1.99.

Contact: Phoenix Publishing Associates Ltd, 14 Vernon Road, Bushey, Herts WD2 2JL. Tel: (0923) 32109

Fast loader disk drive

Following the success of RAM Electronics 1541 Express, comes Quickdisc — a new utility program for Commodore 1541 and 1542 disk drives enabling the user to load programs onto the computer at "more than double the normal speed," according to distributors Evesham Micro Centre.

One of the main features of Quickdisc is the Menu Maker, which the user saves to disk along with the Quickdisc system. From then on, one command enables any program on a given disk to be loaded at high speed. Those Commodore owners who have the tape-to-disk utility Disco can convert any programs transferred with Quickdisc into "Auto" fast loaders.

Both Disco and Quickdisc are programmed by software developer Softcell. Quickdisc sells for £11.95.

Contact: Evesham Micro Centre, Bridge Street, Evesham, Worcester WR11 4RY. Tel: (0386) 49641

Computerised Highway Code

The Automobile Association has given the green light for a Commodore version of Highway Code based on the book produced by the HMSO.

CRL Group, a software house, says the program consists of more than a hundred questions from the book and gives the user a percentage rating from one of the two tests available — one with 25 questions and another with 10. Graphics show road signs and traffic situations to further try the learner.

Highway Code costs £5.95 and each copy carries an AA Approved sticker.

Contact: CRL Group PLC, CRL House, 9 Kings Yard, Carpenter's Road, London E15 2HD. Tel: 01-533 2918

ACS getting organised

Associated Computer Supplies is offering a range of desk-top copyholders, including a sophisticated automatic unit that works with a foot operated linefinder.

The manual copyholders, which start at £18, come in free-standing easel form or as a flexible arm model which may be clamped or mounted permanently to the working surface. The holders are made of black enamelled steel and are available in letter, legal and printout or ledger sizes.

Automatic copyholders range from £55 to £77.50 and feature seven variable line spacings and a pedal linefinder. ACS says discounts are available for quantity discounts.

Contact: Associated Computer Supplies Ltd, Bowmaker House, Etruria Road, Hanley, Stoke-on-Trent, Staffs ST1 5NH. Tel: (0782) 287121

Business on a budget

Continuing a line of budget-priced software for the 64, Kuma Computers has released a cassette-based Spread Sheet Calculator.

The Calculator's series of blocks is 26 columns horizontally by 50 rows vertically. Totals, sub totals and formulae all are in different colours, making the screen display easy to read. The user can move, delete and copy rows and columns of data, and a currency format is useful for planning budgets in that it can display all data with two decimal places.

Aimed largely for the first time user, the Spread Sheet Calculator comes with an introductory manual and sells for £14.99.

Contact: Kuma Computers Ltd, 12 Horseshoe Park, Pangbourne, Berks RG8 7JW. Tel: (07357) 4335

Up on modems

Prestel, Micronet, Telecom Gold, Easylink and Homelink all are accessible with a new modem costing less than £50.

Unicom Ltd says all software commands can be incorporated into the owners' own programs and a unique error correct protocol ensures that files and programs can be sent, stored and received with no transmission errors. The modem automatically redials until connected and remote facility allows owners to dial up their own or other micros to upload or download software.

The manufacturer says Unicom can also answer automatically, then upload or download data into a micro and printer. The modem's software incorporates a bulletin board facility enabling the owner to set up his own or access all others.

Contact: Unicom Ltd, 20 Orange Street, London WC2H 7ED. Tel: 01-930 1612

Slow micro

With all the emphasis on speeding up the microcomputer, Nidd Valley Micro Products has come up with a unique concept — slowing it down!

The idea is not as absurd as it sounds. Called Slomo, this new piece of hardware actually gives the micro slow motion and freeze frame capability by simply plugging into the user port of your Commodore.

One of the primary uses for Slomo, which sells for £14.95, is in controlling games. Nidd Valley says Slomo allows "infinitely variable skill levels" in 95 percent of Commodore games. Players also can learn fast paced, high skill games at a slower pace, and multi-paged games with unselectable but increasing skill levels can start to be played with Slomo at normal speed on the easier early levels and then at slower speeds as the game progresses.

"Slomo is ideal for younger children, adults and those who would love to attempt today's complex games but who do not have the skill, reaction levels or the confidence needed," Nidd Valley says.

Slomo
SPEED
Slow
Fast
FREEZE FRAME
SLOW MOTION
a Nidd Valley Product
Made in England

"Slomo must provide a new doorway to computing and micro recreation for the disabled, without the need for special software."

Manufactured and distributed by Cambridge Computing, Slomo may help in de-bugging programs because it allows graphics to be viewed pixel by pixel or sound to be heard note by note. Program listings can be viewed one letter or line at a time. It also controls educational programs to suit the learner's age and allows the user to freeze the display on the screen for taking photographs.

The one possible drawback we can see is that the freeze frame function takes effect only when you are pressing the key, which could be inconvenient if you want to freeze something for a long period of time.

Contact: Cambridge Computing Research Ltd, 61 Ditton Walk, Cambridge CB5 8QD. Tel: (0223) 214451

Floppy shares on floppy disk

Cambridge based chartist Investment Research has launched its first monthly share guide on floppy disk for private and professional investors with their own microcomputers.

Each month the IR Special Situations Disk analyses about 25 shares and markets that Investment Research think worth following and likely to be rewarding. IR says it will be the first share guide that allows investors to analyse the data and reasoning that went into the investment recommendations.

With each monthly disk is a brief note on interesting aspects of the technical position of price and market levels as well as forecasts of future levels. Subscribers can use their computers to rework the data into the time period they want. A 200 day moving average of a share price, for example, can be converted into an average on the basis of 150 or 180 days. The user also can update the information.

The Special Report comes out monthly and costs £75 each time.

Contact: Investment Research of Cambridge Ltd, 28 Panton Street, Cambridge CB2 1DH. Tel: (0223) 356251

By the book

A senior lecturer in accounting and finance at University of Lancaster is the author of a new computer accounting book published by Mace Computer Services.

Called Accounting Software: Implementation, the 200-page volume is complemented by disk based software, also available from Mace, for CBM 8000 Series micros. Computer based accounting, desirable software features, 'Events Accounting' program listings and day to day use are among the subjects covered in the book.

Author JR Mace, BA, MSc, FCA, has consulted for Megapalm, a company based in Nether Kellet specialising in analysis, design and installation of computer based business systems.

At £15, the book is available post free in the UK from the publisher.

Contact: Mace Computer Services Ltd, Downderry, Halton Road, Nether Kellet, Carnforth, Lancashire LA6 1EU. Tel: 0524 733801

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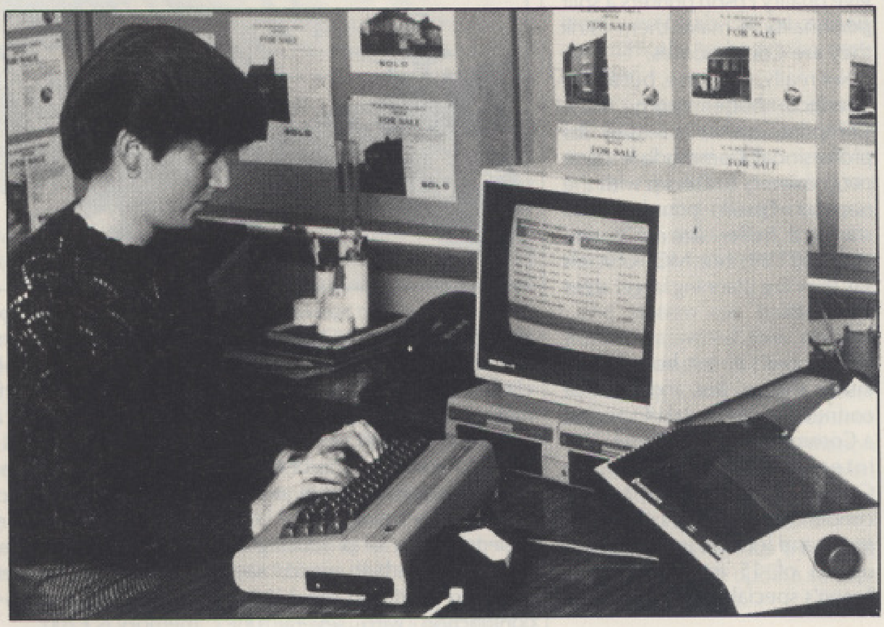
National Property Link

Estate agents rejoice! A computer could take off your hands that tedious task of cross-referencing your clients with buyers or vice-versa... and on a national scale, if you like



A Wiltshire based company, National Property Link, have come up with a new way to buy and sell properties using the Commodore 64 and Commodore's nationwide communications network, Compunet.

Access to a national database of property information may soon be at the fingertips of estate agents throughout Great Britain allowing them to help each other find properties for their applicants and buyers for their clients.

The Property Information Service uses basic Commodore equipment supplemented by software, so that the estate agent can match client information he has filed on one disk to information on properties stored on another disk.

But that is only on the local level. The Compunet link expands this capability to a national scope simply by "uploading" (sending) the local information to the national database where it is retrieved by other allowed users.

"The national network can be accessed by local estate agents with a simple telephone call", says Nick Laing, managing director of NPL.

The agent doing the uploading can determine who gets access to his information – one other agent or a consortium of agencies with a mutual agreement. This is done with what NPL call multiple levels of security to "ensure that information can only be viewed by those classes of subscribers defined by the agent".

On the various classification levels:

*Private – available only to the originating office and other offices of the same firm;

*Confidential – restricted to registered members of a "user group", typically members of a consortium of agencies;

*Open – may be scanned by all NPL agency subscribers;

*Public – available for viewing by all subscribers to the Compunet system.

The actual operation of the system on screen is quite simple. The property details register shows a summary of the property on offer, one to three pages of details, a form for contacting the representing agent and a screen of confidential information, the latter of which is never uploaded into the national database and thus will never be revealed to anyone outside the originating agent's office.

The matching of applicants with properties is done within the computer, so the agent is spared the agony of flipping through screens of material to find a specific type of property for the client or vice versa. For example, a client might specify a particular area – city, county, region, etc. – and a general price range. The agent refers to a manual that lists particular code numbers for each area, enters that and the requested price into the computer and the machine does the rest.

Once the matching is done, an interested agent can contact the agent for a particular property or applicant through the Courier electronic mail service. That service also can be used for private mail among agents and for other Compunet subscribers who want to contact an agent at once.

In terms of expenses, the estate agent incurs no telephone costs when doing local work. Charges are levied only when the operator is accessing the national system, probably once or twice a day for down loading and/or uploading. The information received from the national database cane be stored on disk in the local office for use any time.

While Compunet is accessed, costs are calculated by British Telecom with the usual discounts during standard and cheap-rate periods. Laing estimates this could cost about £100 per month.

In equipment, the system requires a Commodore 64, monitor, a dual disk drive, a printer (either dot matrix or daisy wheel will do) and a modem, all of which can be either purchased for about £1200 or leased at a rate of about £40 per month.

"It's all absolutely standard", says NPL Systems Consultant Ken Fraser. "One is not dependent here on specials that have been made up".

The dual disk drive is required so that a property register disk can be inserted into one and an applicant register disk in the other, allowing the vital cross referencing.

The service requires standard stationery and floppy disks, and maintenance is available six days a week from Servicepoint. The NPL contract also provides for installation, initial training and troubleshooting during the term of the agreement with an initial £250 fee for the software.

Laing says that, while the actual software can be used on other microcomputers, Commodore equipment was chosen for the system because "Compunet has been specifically designed for the Commodore".

Expanding to other machines, then, will eventually depend on Compunet's policies. The system also does not work on the Plus/4 or the C16 because they do not have the capability to work with a modem.

Contact: National Property Link, Water Eaton, Swindon, Wiltshire SN6 6JU. Tel: (028581) 521 or 567

Identity crisis

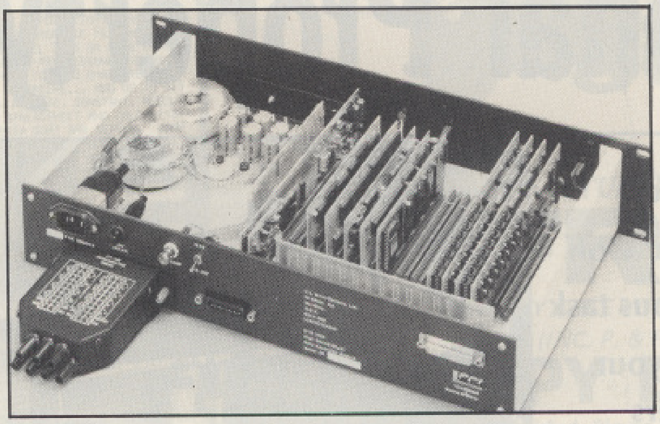
Micro Control Systems hopes to give quality Epson printers a split personality – make them think they are Commodores.

Not really, of course, but a new interface buffer from MCS, Comprint, makes it easier for professional Commodore computer owners to link up with the popular Epson printers. The standard buffer size is 2K and costs £61.99, but MCS officials say they are planning larger sizes up to 32K.

Comprint's circuit board plugs inside the printer and a cable connects to the Serial I/O port of a Commodore 64 or Plus/4. The interface also gives the Commodore capability to use condensed print and other type styles and lets the user have the option of 15 inch paper and Epson's special characters.

Contact: Micro Control Systems, 1 Cherrywood Drive, Aspley, Nottingham NG8 3NN. Tel: 0773 769011.

More for less



"A very fast, very accurate high storage intelligent A/D converter at a very reasonable price" is the claim CIL MicroSystems is making about its newest product, the DTR 1580.

"Up to now this type of instrument was only available at very high cost because of the expensive way of producing 16 bit accuracy at high speed," says CIL, who produced the 1580 in conjunction with several universities. The standard model has 128K memory with options of up to 512K in steps of 64K. Recording analysis and subsequent transfer of data are among the programs available for use with DTR 1580.

"Accent is on simplicity," CIL says. "By using ASCII data transfer the unit has been made as simple as possible to operate, with the options of IEEE and RS232 it can be used with the majority of computers."

The basic model sells for £1,800 and each 64K of extra memory is £200.

Contact: CIL Microsystems Ltd, Decoy Road, Worthing, Sussex BN14 8ND. Tel: 0903 210474

Business views

A communications software package specifically designed for accessing Prestel and private systems with business micros is now available from Tandata.

Entirely menu-driven with prompts included, Viewtext is designed for use with Tandata's autodial modems. A dialing directory holds up to 72 telephone numbers as well as identity numbers or passwords.

Other items include a speed page facility for rapid access to frequently used pages, choice of single or split screen display, page comparison with highlighting of differences, an off-line editing facility, off-line messaging, form fill capability and automatic dating of files when they are stored.

One of Viewtext's unique features allows the user to log on to a data base, transmit prepared messages, retrieve data from the host computer, go off-line and

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RS 232 handic software

RS 232
At last an RS 232 interface for your Commodore 64, which allows you to connect your CMB to all RS 232 equipment such as printers, modems, disk drives etc. By using switches on the **outside** of the RS 232 cartridge you can change the **CTS-line** from high to low or vice versa to suit the peripheral you are using without having to switch your computer off. What could be easier?

The RS 232 cartridge is available from your nearest computer dealer or clip the coupon.

V24 (RS232) Interface
CTS
MODEM
PRINTER

then print the retrieved data. These functions can also be controlled by a clock to take advantage of lower telephone or data base charges.

Compatible with the Commodore 64, Viewtext costs £48.30 incl. VAT. The two possible modems range in price from £99 to £217. Optional related products such as an add-load disk also are available.

Contact: Tandata Marketing Ltd, Albert Road North, Malvern, Worcestershire WR14 2TL. Tel: 06845 68421

Networking simplified

Nectar company has offered a new concept for a communications system – using standard electricity power cables as the network.

"Using NectarRing, anyone in the building can plug into any convenient power socket for instant networking," says the company.

Nectar says the system is completely safe and does away with the need for specially installed cable of fibre-optic links. NectarRing also eliminates redesigning a system every time a computer is moved from its permanent base.

A NectarRing unit rests beside each computer, printer or other remote device, and a lead from the computer plugs into the NectarRing which then plugs into the power mains. The device can connect to all common types of RS232C ports and several others. Speeds up to 4800 Baud take information in both directions.

At a cost of £125, NectarRing's applications include remote monitoring and control, security systems, electronic mail and building energy management systems.

Contact: Nectar, Westgarth House, Lyndhurst Grove, Gateshead NE9 6AX. Tel: 091-482 3745.

Payroll vitals

Detailed payroll information for up to 100 employees can fit on one disk with new software from Landsoft.

The London based company says Payroll Plus 64 complies with specifications drawn up by the Inland revenue for computerised payrolls. It provides for all tax codes and the usual National Insurance codes as well as allowing the user to keep complete details of hourly, weekly and monthly paid staff on the same disk in any order.

Additionally, the program allows three rates of overtime, which can be different for each employee. In the case of hourly paid staff, the rate can be calculated as an amount or a percentage of the basic hourly rate.

Other features include pre-tax adjustments, a comprehensive payslip and employer's variables. At the end of the year all grand totals and the individual employee totals can be zeroed automatically to begin the new tax year.

The program operates on the 64 with a Commodore 1541 single disk drive and compatible printer "therefore providing an extremely cost-effective computerised payroll system, even for the smallest business," Landsoft says.

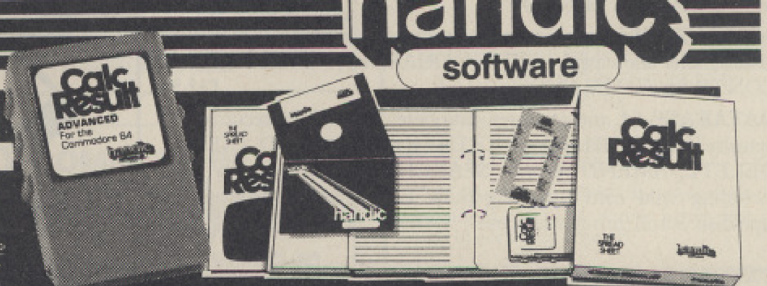
The system can be secured with a password that can be easily changed if and when necessary, and users must register for the software update service that issues information sheets whenever changes need to be made in tax and national insurance requirements.

Price of Payrol Plus 64 is £85 excl VAT and the update service costs £20 per year.

Contact: Landsoft, 28 Sheen Lane, London SW14 8LW. Tel: 01-878 7044/7

Calc Result

handic software



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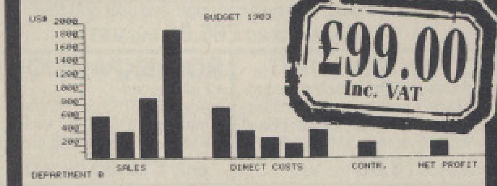

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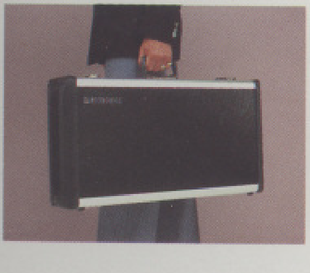

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